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CHEMICAL SOIL DATA REPORT TO SUPPORT INTERIM RESPONSE ACTIONS, CONSTRUCTION STAGING AREA, AND ADMINISTRATION BUILDING

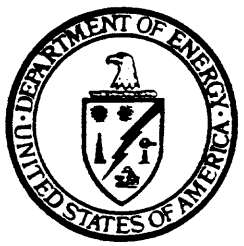
For The :

Weldon Spring Site Remedial Action Project

Weldon Spring, Missouri

Prepared By MK-Ferguson Company

FEBRUARY, 1989 **REV. 0**



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WELDON SPRING SITE REMEDIAL ACTION PROJECT

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Prepared for:
U.S. DEPARTMENT OF ENERGY
Oak Ridge Operations Office
Under Contract No. DE-AC05-86OR21548

by

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Project Management Contractor
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ABSTRACT

Five activities are planned to improve environmental conditions or to improve facilities at the Weldon Spring Site. Each activity must be evaluated for potential environmental impacts. Chemical soil contamination was potentially present in each affected area. A sampling program was designed and implemented to evaluate chemical soil conditions. Samples were analyzed for nitroaromatic compounds, metals, inorganic anions, semi-volatile and volatile organic compounds, pesticides, and PCBs.

This investigation documented low concentrations of semi-volatile organic compounds, pesticides, PCBs and nitroaromatics. Higher concentrations of nitrate, sulfate and some metals were also detected.

The contaminants detected are consistent with past operations at the WSS. The concentrations of contaminants do not significantly impact the proposed activities. Data from this investigation has been incorporated into the planning and documentation activities for each activity.

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1 INTRODUCTION

This report addresses three areas proposed for interim remedial action (IRA) and two areas where construction is planned prior to completion of chemical soil characterization. The three IRA areas are the Ash Pond Isolation Dike (AID), the Southeast Drainage Isolation Dike (SID), and the Material Staging Area (MSA). The two construction areas are the locations of the Administration Building (AB) and the construction staging area (CSA). These areas are shown in Figure 1.

The soils in these five areas were sampled in support of the design of the IRAs, to validate previous sampling results, and to evaluate the environmental impact of the IRAs. This report summarizes the analytical data from these samples.

This soil characterization effort was required before the overall chemical soil characterization could be performed. The overall chemical soil characterization program is described fully in the chemical soil characterization sampling plan (MK-F, 1988a). The overall soil sampling rationale is presented in that sampling plan and should be reviewed before attempting to further interpret the analytical data presented in this report.

The three IRA areas were identified during previous investigations as areas which could benefit from small actions not biasing an overall Record of Decision (ROD) on the disposition of the majority of the wastes on site. These IRAs support the overall Weldon Spring Site Remedial Action Program (WSSRAP) and will maintain exposure as low as reasonably achievable. These actions consist of diverting and isolating surface drainage in two areas and constructing a contaminated materials storage area.

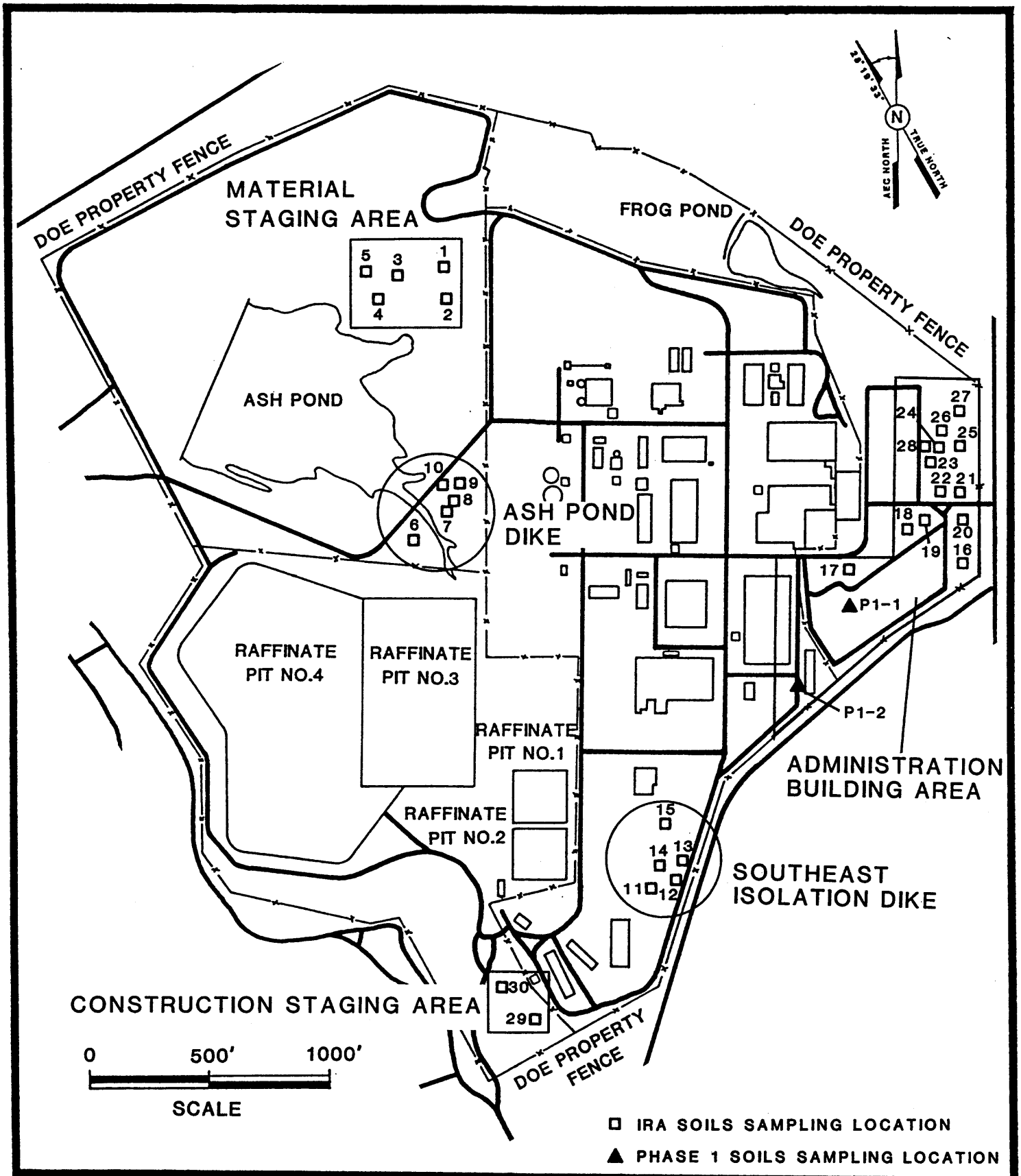


FIGURE 1

WELDON SPRING IRA SOIL SAMPLING LOCATIONS

1.1 PURPOSE

The purpose of the soil sampling in each of the areas was to provide data for the design of the IRA and construction activities. Sampling analyses provided information on chemical soil contamination in the areas affected by the isolation and drainage dikes and on the storage area for holding contaminated materials. The results also delineate conditions in the vicinity of the proposed Administration Building and the Construction Staging Area.

1.2 SCOPE

This program was designed to detect chemical soil contamination from the Weldon Spring Ordnance Works (WSOW) and the Weldon Spring Uranium Feed Materials Plant (WSUFMP) in the five areas. The WSOW produced explosives for use in World War II from 1941 to 1945. The WSUFMP processed uranium ore and produced uranium metal from 1956 to 1966. These two facilities comprise the known potential sources for chemical soil contamination.

Radiological contamination in each area is not discussed in this report. Radiological characterization data is presented in Radiological Characterization Reports for each IRA.

This sampling effort consisted of collecting 150 samples from 30 sample locations. Five borings were located in the Material Staging Area, five in the Ash Pond Isolation Dike area, and five in the Southeast Isolation Dike area. Thirteen borings were located around several proposed Administration Building sites, and two borings were located in the Construction Staging Area. Table 1 lists all boring locations, west-north coordinates and boring depths. The location numbers (1-30) correspond to the locations shown in Figure 1. Boring depths were determined by evaluating the depths that will be affected

TABLE 1

BORING LOCATIONS

LOCATION NO.	IRA AREA	COORDINATES WEST, NORTH	BORING DEPTH (FEET)
1	Material Staging Area	51150, 101207	10
2	Material Staging Area	51137, 101068	12
3	Material Staging Area	51360, 101175	10
4	Material Staging Area	51445, 101065	12
5	Material Staging Area	51500, 101190	12
6	Ash Pond Dike	51308, 100085	10
7	Ash Pond Dike	51150, 100220	10
8	Ash Pond Dike	51125, 100260	10
9	Ash Pond Dike	51100, 100335	10
10	Ash Pond Dike	51180, 100335	7
11	Southeast Isolation Dike	50290, 98700	8
12	Southeast Isolation Dike	50160, 98735	12
13	Southeast Isolation Dike	50140, 98820	8
14	Southeast Isolation Dike	50252, 98800	8
15	Southeast Isolation Dike	50230, 98991	8
16	Administration Building	49000, 99985	8
17	Administration Building	49475, 99985	12
18	Administration Building	49250, 100140	10
19	Administration Building	49172, 100180	8
20	Administration Building	49000, 100180	8
21	Administration Building	49000, 100295	8
22	Administration Building	49080, 100295	10
23	Administration Building	49132, 100440	16
24	Administration Building	49101, 100500	16
25	Administration Building	49000, 100500	12
26	Administration Building	49082, 100570	16
27	Administration Building	49000, 100665	12
28	Administration Building	49160, 100500	12
29	Construction Staging Area	50800, 98150	15
30	Construction Staging Area	50950, 98300	15
P1-1	Phase I - Admin. Building	49500, 99800	6
P1-2	Phase I - Admin. Building	49700, 99500	6

P1 - Phase I Chemical Soil Investigation Location.

by the specific construction activity and the depth of fill in each specific area.

Analytical parameters were selected on the basis of the results of Phase I chemical soil investigation (MK-F, 1988b) and Phase I water quality assessment (MK-F, 1987) which detected elevated concentrations of inorganic anions, metals, and nitroaromatics in several areas of the Weldon Spring Site (WSS). Certain locations were analyzed for Hazardous Substance List (HSL) volatiles, semi-volatiles, pesticides, and PCBs to provide additional information of the affected areas.

A brief description and the previous characterization data for each area is presented in the following subsections. The sampling and analysis methods are described in Section 2. Analytical data and interpretations are presented in Section 3.

1.3 MATERIAL STAGING AREA

The Material Staging Area (MSA) consists of approximately three acres located about 1,100 feet north of Raffinate Pit 3. This area subtends 500 feet by 250 feet and will be used to store contaminated materials from other IRAs, such as Debris Consolidation and Army Vicinity Property cleanup.

Previous investigations (MK-F, 1988b) in the MSA included adequate radiological soils characterization, but used only one borehole for chemical analyses. No chemical contamination was detected in this single borehole. Therefore, additional data were required to more fully characterize any chemical contamination which could be present in this area.

The additional chemical characterization for the MSA consisted of five boreholes drilled to depths of 10 ft to 12 ft with continuous sample collection. These depths exceed the depth of soil disturbance expected from this IRA. Samples were

composited over two-foot intervals in each borehole. All samples were analyzed for metals, inorganic anions (nitrate, sulfate, chloride, and fluoride), and nitroaromatic compounds. Certain locations were analyzed for pesticides, PCBs and semi-volatiles. After sampling, the boreholes were sealed by grouting with a cement-bentonite grout.

1.4 ASH POND ISOLATION DIKE

The Ash Pond Isolation Dike (AID) is proposed to divert surface runoff around the contaminated areas of the South Dump and Ash Pond by means of an earth embankment and drainage channel.

Previously collected information within the affected area consisted of adequate radiological soils characterization data, but only one borehole and three samples were analyzed for chemical parameters (MK-F, 1988b). These analyses indicated slightly elevated nitrate and sulfate levels in the soils. Chemical characterization data was required to evaluate the effects of ponding water on soils in the area affected by this IRA. These data will be used to further define the environmental impacts of the proposed IRA.

Additional characterization activities to support the AID IRA included drilling five boreholes ten feet deep with continuous sample collection. Samples were composited over two-foot intervals in each borehole and analyzed for metals, inorganic anions, and nitroaromatics. Also, certain locations were analyzed for pesticides, PCBs, and semi-volatiles. The boreholes were sealed by grouting with a cement-bentonite grout. The boreholes were located in potential borrow areas and at the former locations of Weldon Spring Ordnance Works (WSOW) buildings and wastewater lines.

1.5 SOUTHEAST ISOLATION DIKE

The third IRA requiring additional characterization is the Southeast Drainage Isolation Dike (SID). The scope of this IRA is similar to the AID IRA. No known structures or process lines from the WSOW were in this area.

Characterization requirements and activities for this IRA were also very similar, with five boreholes drilled. Samples were collected continuously and were analyzed for the same chemical parameters as other IRA locations.

1.6 ADMINISTRATION BUILDING AREA

Four proposed sites for the Administration Building (ABA) were investigated to ensure the selection of an uncontaminated area for this building (Figure 2).

The chemical characterization activity for this area consisted of drilling 13 boreholes with continuous sample collection. The boreholes varied in depth from 10 ft to 16 feet, which exceeds the excavation depth for building construction. At each borehole location, the samples collected were composited over two-foot intervals. These samples were analyzed for the same parameters as the other IRAs.

One of the boreholes was located at the site of a WSOW Toluene Storage Area. Samples from this borehole were analyzed for volatile and semi-volatile compounds in addition to the other parameters.

1.7 CONSTRUCTION STAGING AREA

The Construction Staging Area (CSA) covers approximately one acre at the southwest corner of the WSCP/WSRP. This area was a candidate site for construction support facilities including

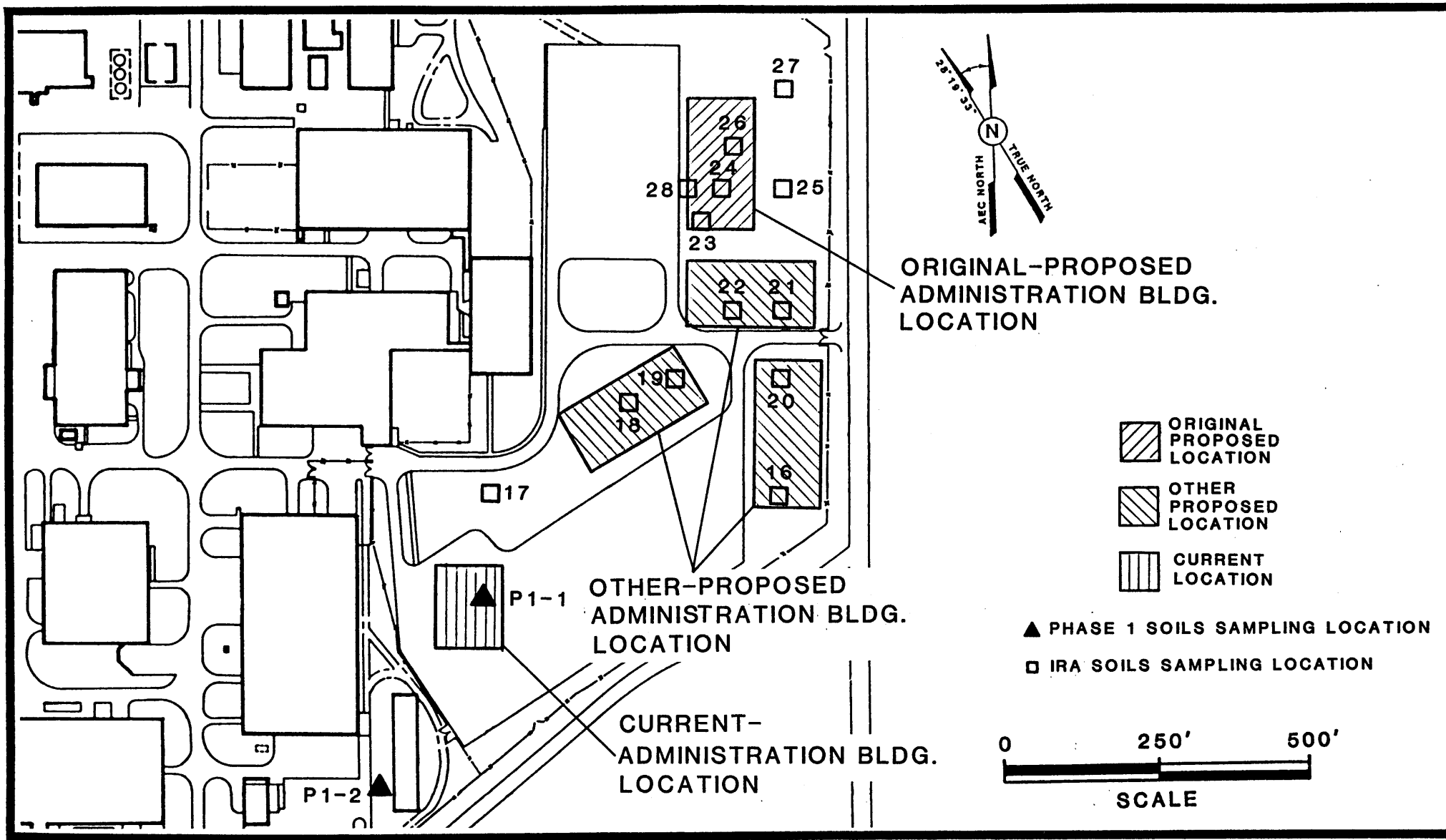


FIGURE 2

ADMINISTRATION BUILDING LOCATION

decontamination facilities for vehicles and personnel, a subcontractor trailer area, a guard shelter, and a control point for access to the controlled area.

The chemical characterization activities for this area consisted of drilling two boreholes to a depth of 15 feet. Two composite samples from each location were collected. The samples from the 0-ft to 7-ft interval were analyzed for metals, inorganic anions (nitrate, sulfate, chloride, and fluoride), nitroaromatic compounds, semi-volatiles, volatiles, PCB's and pesticides. The 8-ft to 15-ft interval samples were analyzed for inorganic anions only.

2 SAMPLING AND ANALYSES

2.1 SAMPLE COLLECTION

A total of 150 samples were collected from 30 sample locations using a truck-mounted Central Mine Equipment 55 (CME) drill rig employing a 6 5/8 inch O.D. hollow stem auger for drilling and the CME continuous sampler system. All samples, except those located in the Construction Staging Area, were composited over two-foot intervals to optimize analytical costs and achieve representative samples.

2.2 EQUIPMENT DECONTAMINATION

Soil sampling equipment was cleaned using a decontamination procedure designed to protect against cross contamination by nitroaromatic compounds and other chemical species. All augers, drill rods, and continuous samplers were washed using a high-pressure hot water washer. Augers and drill rods were cleaned between boreholes while continuous samplers were decontaminated between samples.

After washing, the continuous samplers were allowed to air dry. Then they were rinsed with toluene, followed by rinsing with acetone and hexane. The toluene rinse was used to dissolve any nitroaromatic residues. Acetone and hexane rinses were employed to remove toluene and other contaminants not removed by the hot water wash. The continuous samplers were allowed to air dry again prior to being reassembled. All rinsing solvents were collected. Stainless steel spatulas and pans were washed with distilled water, then rinsed with the same solvent sequence as used on the continuous samplers. This procedure was performed between every sample.

Field personnel wore new disposable vinyl gloves when collecting soil samples. Gloves were changed after decontaminating sampling equipment.

2.3 SAMPLE HANDLING AND PRESERVATION

The filled continuous samplers were opened in a shaded area to prevent photolysis of nitroaromatic compounds. Samples were collected from the continuous core using decontaminated stainless steel spatulas and pans. No chemical preservation was required during sample collection. The collected samples were placed in a cooler with blue ice. All samples were chilled immediately following sample collection and kept chilled throughout sample collection and shipment. All field samples were sent to the analytical laboratory in accordance with WSSRAP chain-of-custody standard operating procedures.

2.4 SAMPLE ANALYSES

Sample analyses were performed according to applicable EPA CLP protocols for metals, organics, pesticides, and PCBs. EPA method 300.0 was used for nitrate, sulfate, chloride, and fluoride analyses. EPA method 106.1 was used for pH analyses. Nitroaromatic compound analyses were performed following USATHAMA - HPLC methodology. Analytical parameters were selected on the basis of known or suspected contaminants from WSOW and/or WSUFMP processes. Samples were analyzed by metaTRACE, Inc. of Earth City, Missouri.

2.5 SAMPLE DESCRIPTION

A soil description for each sample was recorded in the field during sample collection. The soil samples from the Material Staging Area consisted primarily of gray-brown mottled clay. The Ash Pond Isolation Dike area soil was mostly rusty-red cherty clay. The Southeast Isolation Dike soil was

more varied with gray brown mottled clay, orange-gray mottled clay with sandy layers, buff dense gray silty clay, and orange-gray mottled clay with chert. The soil in the Administration Building Area consisted mostly of brown-gray mottled clay with some red-gray mottled clay. The soil in the Construction Staging Area was mostly brown-gray mottled clay with small amounts of red-gray mottled clay.

The soil sample descriptions in Appendix A address each sample interval in detail. These soils are typical of WSCP/WSRP soils which consist of the following units: Ferrelview Formation, clay till and basal till. A more detailed description of WSCP/WSRP soils is provided in the chemical soil investigation sampling plan (MK-F, 1988a).

3 DATA SUMMARY

This section presents a summary of the results of the chemical soil analyses. The detailed results of the inorganic and metals analyses are presented in Appendix B. Only those volatile, semi-volatile, PCB, and pesticide results which were above the detection limits are discussed in the following subsections. The detection limits achieved during these analyses are presented in Appendix C. These detection limits are in agreement with those required in the EPA Contract Laboratory Program (CLP).

As part of the Phase I chemical soils investigation (MK-F, 1988b), background metal concentrations across the WSS were analyzed. The results of this analysis are reproduced in Table 2. These background ranges should be considered when interpreting the concentration levels in samples taken from the five IRA and construction areas discussed in this report.

Aluminum, calcium, and magnesium are common in the clay soils present at the WSCP/WSRP. Clay particles are composed primarily of aluminum, calcium, and magnesium silicates with iron, potassium, and sodium ions readily interchangeable into the particle structure. In addition, elevated manganese levels are attributable to the presence of pyrolusite (MnO_2) in the soil.

Completion of this soil characterization program provided a large data set of inorganic anion results. The inorganic anion concentrations from this investigation and from the Phase I chemical soil characterization (MK-F, 1988b) were evaluated statistically to determine average background concentrations and ranges. Frequency histograms were plotted for each inorganic anion. These histograms were evaluated to detect concentrations outside the normal background distribution of inorganic anions. Elevated concentrations were removed from the data set prior to

TABLE 2

Statistical Data for Background Metal Concentrations in Soils at the WSCP/WSRP

Compound	Sample Size	Arithmetic Mean mg/Kg	Geometric Mean mg/Kg	Arithmetic Standard Deviation mg/Kg	Onsite Background Ranges Low mg/Kg	Onsite Background Ranges High mg/Kg
Al	142	12,536	11,350	4,902	1250	27,700
Sb	98	29	25	8	2	40
As	114	6	6	4	2	15
Ba	140	161	145	70	25	390
Be	129	1	1	1	< DL	6
Cd	125	3	3	1	< DL	7
Ca	114	3,495	3,044	1,839	190	9,300
Cr	144	24	23	6	2	42
Co	144	16	14	7	6	40
Cu	143	15	14	6	3	34
Fe	139	18,636	17,914	5,306	8,500	35,400
Pb	127	29	25	16	7	84
Li	92	10	9	3	< DL	17
Mg	133	2,437	2,256	956	417	5,900
Mn	127	495	370	334	49	1,400
Hg	Background less than the detection limit of 0.1 mg/Kg					
Ni	138	19	18	7	7	43
K	145	757	698	311	255	1,701
Se	Background less than the detection limit of 0.5 mg/Kg					
Ag	96	3	2	2	1	13
Na	136	486	437	202	49	982
Tl	Background less than the detection limit of 1.0 mg/Kg					
V	141	35	34	7	6	54
Zn	141	45	39	29	6	220

< DL - Less than detection limit

Source: MK-F, 1988b

calculating the arithmetic mean, arithmetic standard deviation, and the geometric mean. This statistical information is presented in Table 3. These background ranges were used to evaluate the data from this investigation.

3.1 MATERIAL STAGING AREA

Analyses of the samples from the Material Staging Area detected no significant concentrations of nitrate, fluoride, sulfate, chloride, or nitroaromatic compounds. However, several organic compounds were detected. Appendix B presents the results of analyses for metals and inorganic anions in the Material Staging Area samples. Table 4 summarizes the significant organic data.

Twenty-eight samples were taken from five boreholes. Phthalates were identified in 12 samples. Phthalates are usually a result of laboratory contamination. The most common source is from the leaching of sample containers and laboratory tubing. However, dimethyl phthalate and di-n-butylphthalate are constituents of explosive propellants used in fuel matrices of double base rocket propellants, and they have also been used as insecticide propellant.

Phthalates were identified in samples taken from all five areas and were not detected in any of the field blanks. Therefore, they could be widespread in the area soils at a level of about one part per million. The final determination of the effects of phthalates in WSCP/WSRP soils will be made in the overall soil characterization program.

Aldrin, a pesticide, was found in two samples from the MSA. In sample SO-51137, 101068, Aldrin was found in the 0-ft to 2-ft, 2-ft to 4-ft, 4-ft to 6-ft, and 10-ft to 12-ft samples in concentrations ranging from 20 ug/kg to 1,600 ug/kg. In sample

TABLE 3

**STATISTICAL DATA FOR
BACKGROUND INORGANIC ANION CONCENTRATIONS
IN SOILS AT THE WSCP/WSRP**

COMPOUND	SAMPLE SIZE	ARITHMETIC MEAN mg/Kg	GEOMETRIC MEAN mg/Kg	ARITHMETIC STANDARD DEVIATION mg/Kg	ONSITE BACKGROUND RANGES LOW mg/Kg	ONSITE BACKGROUND RANGES HIGH mg/Kg
Nitrate	250	2.5	1.09	2.0	0.5	10.0
Sulfate	247	33.0	23.00	27.0	1.0	110.0
Chloride	228	4.4	3.60	2.6	0.5	14.0
Fluoride	250	7.7	6.30	4.3	1.0	18.0

TABLE 4

MATERIAL STAGING AREA DATA SUMMARY

Organics

Phthalates found in 12 samples

Chemical	Concentration	Interval	Sample Location	NO.
Aldrin	240 ug/kg	(0-2')	SO-51137, 101068	2
	70 ug/kg	(2-4')	SO-51137, 101068	2
	1,600 ug/kg	(4-6')	SO-51137, 101068	2
	20 ug/kg	(10-12')	SO-51137, 101068	2
	18 ug/kg	(8-10')	SO-51500, 101190	2

SO-51500, 101190, Aldrin was found in the 8-ft to 10-ft sample at 18 ug/kg.

Aldrin is a chlorinated organic contact/fumigant insecticide. It was used to control soil insects in the 1950s and 1960s. Typically, aldrin undergoes biodegradation by oxidation to dieldrin with 75% to 100% disappearance from soils in one to six years. Dieldrin also degrades with 75% to 100% disappearance from soils in three to 25 years.

Given this biodegradation, the low concentrations detected during this investigation should not prohibit these IRA activities. The final effect of low aldrin concentrations will be evaluated in the Phase II chemical soil characterization program.

In summary, no chemical soil contamination was detected in the MSA which would effect performance of this IRA.

3.2 ASH POND ISOLATION DIKE

The Ash Pond Isolation Dike (AID) data summary (Table 5) presents the results of the analysis for detected organics, PCBs, pesticides, and nitroaromatic compounds. No elevated metal or inorganic anion concentrations were observed in AID soils.

Twenty-three samples were taken from five boreholes. The organic test results indicated phthalates in ten samples. Aroclor, a PCB, was identified in two samples at 270 ug/kg. One sample contained 1.04 ug/g of 2,4 DNT. These concentrations are well below cleanup criteria established at similar sites for the same compounds.

Most of the remaining organic compounds in Table 5 are associated with coal tar, gasoline, motor oil, and wood

TABLE 5

ASH POND DIKE DATA SUMMARY

Organics

Phthalates found in 10 samples.

2,4 DNT - 1.04 ug/g

Aroclor - 270 ug/kg

The following organics were identified in sample SO-51100, 100335 (8-10'):

	Concentration
Hexachlorobutadiene	17 ug/kg *
2 Methylnaphthalene	68 ug/kg *
2,4,6 trichlorophenol	68 ug/kg *
2,4,5 trichlorophenol	68 ug/kg *
2-Chloronaphthalene	110 ug/kg *
Acenaphthylene	79 ug/kg *
Dibenzofuran	68 ug/kg *
Diethylphthalate	750 ug/kg
Fluorene	45 ug/kg *
Pyrene	60 ug/kg *
Phenanthrene	54 ug/kg *
Anthracene	44 ug/kg *

* Below U.S. EPA-CLP contract required detection limits

preservatives and have been previously identified in the Ash Pond area (MK-F, 1988b). The compounds 2,4,6 trichlorophenol and 2,4,5 trichlorophenol are used widely in pesticides, fungicides, and bactericides. Hexachlorobutadiene is used as a solvent for synthetic rubber, heat transfer fluids, and washing fluids for removing hydrocarbons.

All of these compounds, with the exception of diethylphthalate, were detected below the U.S. EPA Contract Laboratory Program contract-required detection limits. These contract-required detection limits are established to detect concentrations of environmental concern. Detected concentrations below these limits should not be of concern from an environmental regulation standpoint. Appendix B presents metals and inorganic anion data for the AID samples.

The proposed IRA will not be affected by the chemical contaminants present in this area. No increase in chemical concentrations via surface discharge is expected as a result of impounding or diverting water around Ash Pond.

3.3 SOUTHEAST ISOLATION DIKE

Data for the Southeast Isolation Dike (SID) area are summarized in Table 6. These data represent 22 samples taken from five boring locations. No elevated concentrations of metals, inorganic anions, or nitroaromatic compounds were detected in the SID area. Organic analyses indicated phthalates present in six samples. Aroclor 1248, a PCB, was detected in one sample (SO-50160, 98735) in the 0-ft to 2-ft interval at 468 ug/kg. In the same sample, fluoranthene and pyrene were detected in the 2-ft to 4-ft interval, pyrene in the 4 ft to 6 ft interval, and phenol and 2-chlorophenol in the 8-ft to 10-ft interval. These compounds are associated with coal-tar by-products. Appendix B presents metal and inorganic anion data for the Southeast Isolation Dike samples.

TABLE 6

SOUTHEAST ISOLATION DIKE DATA SUMMARY

Organics

Phthalates found in six samples.

	Concentration
Aroclor 1248 -	1.04 ug/g
Fluoranthene -	270 ug/kg *
Phenol -	14 ug/kg *
2-Chlorophenol -	11 ug/kg *
Pyrene -	110 ug/kg *
	56 ug/kg *

* Below U.S. EPA CLP contract required detection limit.

TABLE 7
ADMINISTRATION BUILDING AREA DATA SUMMARY

Organics

Phthalates were found in 24 samples.

	CONCENTRATION	SAMPLE LOCATION	DEPTH
N-nitrosodiphenylamine -	53 ug/kg*	49101, 100500	4-6'
fluoranthene -	59 ug/kg*	49101, 100500	4-6'
pyrene -	47 ug/kg*	49101, 100500	4-6'
Methylene chloride	17 ug/kg		
	10 ug/kg		
	18 ug/kg		
Chloroethane	12 ug/kg		
2,4,6 TNT	1.4 ug/g		

Nitrates

High nitrate levels were found in sample SO-49101,100500.

CONCENTRATION	DEPTH
141 ug/g	(2-4')
1,285 ug/g	(4-6')
1,354 ug/g	(6-8')
1,297 ug/g	(8-10')
1,202 ug/g	(10-12')
1,108 ug/g	(12-14')

Sulfate - SO-49250 - 100140

CONCENTRATION	DEPTH
1,548 ug/gl	(2-4')

No chemical contamination which would impact the performance of this IRA was detected.

3.4 ADMINISTRATION BUILDING AREA

The Administration Building Area (ABA) data are summarized in Table 7. This summary represents 74 samples from 13 boring locations collected during this investigation. Samples were collected from four general locations in this area during the Phase I chemical soil sampling program (MK-F, 1988a). Several boreholes were located to confirm the past findings of elevated nitrate levels at depth in the original proposed Administration Building location. These findings were made during Phase I chemical soils characterization sampling in early 1987 (MK-F, 1988b). It was determined that the drainage from one of the major process buildings flowed under this location before the area was regraded to its current topography. Additional sample locations were also selected to evaluate other potential building locations. All ABA sampling locations and proposed building locations are presented in Figure 2.

Location SO-49101, 100500, was sampled to confirm previous detection of nitrates. These data support the previous findings of elevated nitrate levels. Elevated nitrate concentrations were detected in all intervals from 2-ft to 14-ft. The source of this contamination is a drainage ditch from WSOW Building 1-T-9 (trinitration house) which was revealed during aerial photography analysis and interpretation.

N-nitrosodiphenylamine, fluoranthene, and pyrene were also identified in the 4-ft to 6-ft sample. Chloroethane was detected in one sample at 12 ug/kg and 2,4,6 TNT was detected in one sample at 1.4 ug/g. Sulfate was detected in one sample (SO-49250 -100140) at an elevated concentration of 1,548 ug/g. Methylene chloride, a probable laboratory contaminant, was

detected in three samples. Appendix B presents data on metal and inorganic anions for the Administration Building samples.

All other IRA activities discussed in this report were designed in support of remedial action and were temporary in nature. The Administration Building was a potentially permanent structure which was to be constructed in an uncontaminated area unaffected by remedial actions. For this reason, additional data were collected and presented, and further interpretations were made.

Previous investigations of WSOW contamination indicated that several process and support areas were most likely contaminated with nitroaromatic compounds. These areas include the wash house, settling tanks, wooden wastewater lines, burn areas, and wastewater lagoons. Chemical contamination from other sources was possible, but was probably less severe with respect to size and concentration than the areas mentioned above.

The siting of the ABA was evaluated using this information. None of the buildings or areas involved in the final production phases or purification process of TNT are located in the vicinity of the ABA. The closest area of concern is more than 700 ft north of the building site and is in a different drainage basin from the ABA site. All WSOW features, proposed building locations, and sampling locations are shown in Figure 3.

The closest two WSOW buildings to the ABA were Buildings 1-T-8 (Acid Recovery) and 1-T-7 (Mono-Nitration). No wastewater was generated in these process buildings. Aerial photography analysis and interpretation of 1945 imagery indicated that there were no drainage features from these process buildings through the ABA. This confirmed that wastewater was not generated.

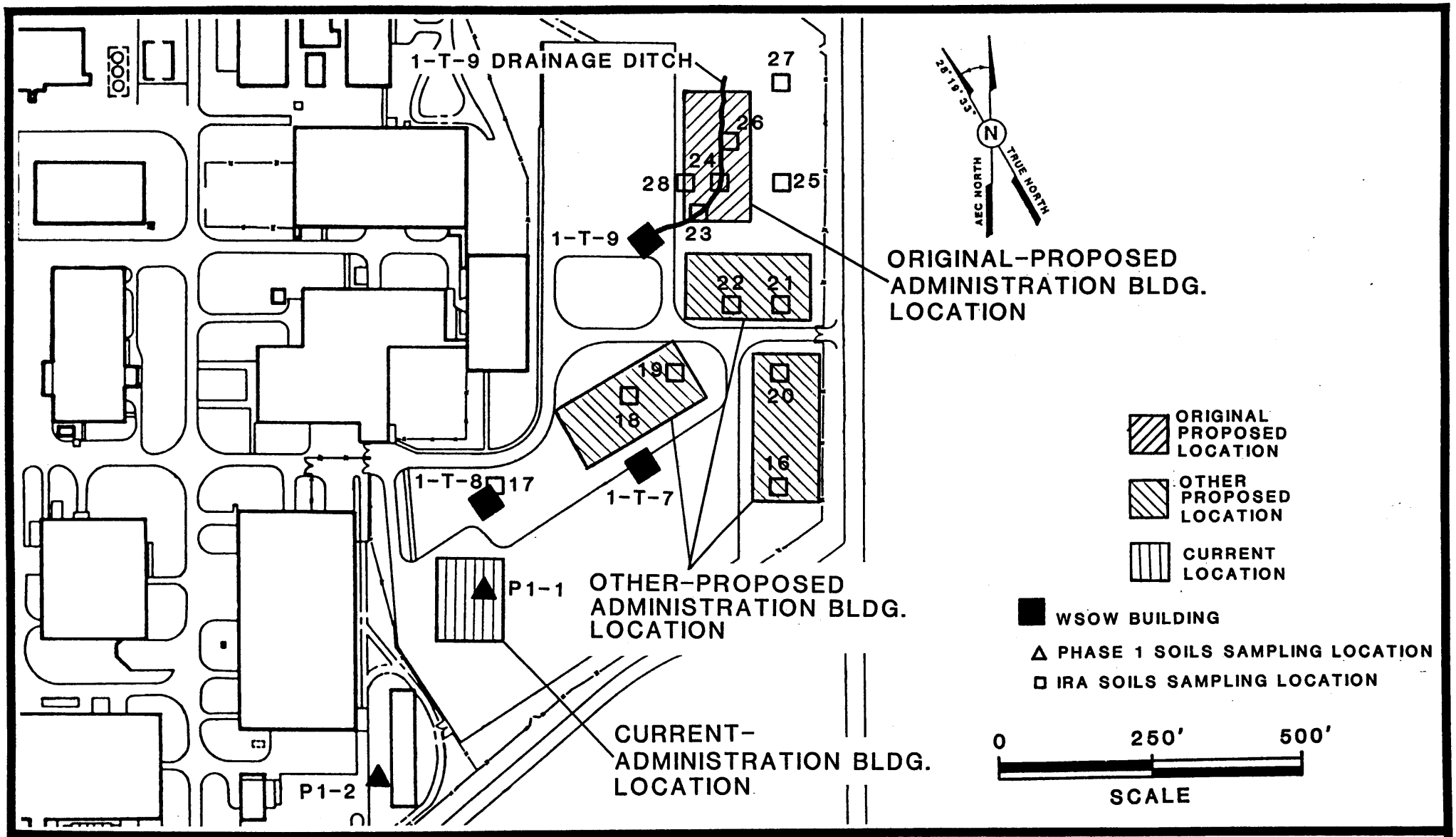


FIGURE 3

ADMINISTRATION BUILDING LOCATION AND WSOW FEATURES

The extensive decontamination efforts performed in 1954, prior to the transfer of WSOW land to the AEC, are documented (MK-F, 1988a) and appear to have been thorough. This interpretation was supported by the absence of elevated concentrations of nitroaromatic compounds in potential source areas as documented in this investigation and the Phase I chemical soil data report (MK-F, 1988b). It may be concluded that the contamination, if present, was removed in 1954.

The ABA area was used for personal vehicle parking for WSUFMP personnel. All contaminants from the process and support facilities drained away from this area. Therefore, no contamination from WSUFMP sources was expected. In addition, any chemical contamination from WSUFMP processes would likely be accompanied by elevated radioactivity levels. Field surveys and soil sample analysis have documented that radioactivity levels are not elevated in this area.

The available data indicate that chemical soil contamination is not present in the ABA and that a permanent facility could be sited at the proposed location.

3.5 CONSTRUCTION STAGING AREA

The Construction Staging Area (CSA) data indicated no chemical soil contamination from four samples taken at the two boring locations. The concentrations of all detected metals were within the background ranges for the Weldon Spring Site. The organic analysis indicated phthalates and methylene chloride present in two samples taken from the 0-ft to 7-ft interval. Both of these organic compounds are probable laboratory contaminants. No significant concentrations of nitroaromatic compounds, nitrate, sulfate, chloride, or fluoride were found.

Chemical soil contamination was not found in the area proposed to be used as a Construction Staging Area.

4 DATA QUALITY ANALYSIS

Analytical quality control procedures were performed according to EPA Contract Laboratory Program (CLP) criteria where applicable. The following summary addresses analytical conformance for GC/MS, GC/HPLC, and inorganic measures. Reference should be made to the CLP quality control requirements for specific control limits. Additional QC information on percent recoveries and duplicate analyses is presented in Appendix D.

GC/MS

The GC/MS analysis conformance summary indicated no blank contamination detected in the B/N or A/E fractions. Methylene chloride was detected in the blank VOA fraction at 2.5 ug/l. Surrogate recoveries were within required limits for the VOA fraction. Fifteen samples were not within the acceptable recovery range for the B/N, A/E fractions. All samples were analyzed within the specified holding time.

GC-(EPA/CLP)/HPLC (USATHAMA)

GC/HPLC conformance summary indicated no contaminants were detected in any of the blank samples. All samples were analyzed within specified holding times.

Metals/Inorganics

The metal/inorganic conformance summary indicated no contaminants were detected in any blank samples. All analyses were performed within specified holding times.

In summary, the data presented in this report is valid and of sufficient quality to be used in this and future assessments.

5 CONCLUSIONS

This soil sampling effort for selected interim response actions provides sufficient data of acceptable quality to support the design of the IRAs. The data from samples collected at depth from each of the five areas provide chemical characterization information pertinent to evaluating the environmental impact of the interim response action.

The data and interpretations presented in this report confirm those of previous investigations indicating limited chemical soil contamination on the WSCP/WSRP. No chemical contamination which would significantly affect the five IRAs discussed in this report was discovered.

This investigation also supported previous conclusions regarding the absence of significant nitroaromatic soil contamination.

The data presented in this report will also be used in support of the overall soil characterization as detailed in the soil sampling plan (MK-F, 1988a).

6 REFERENCES

Karelverschueren Agr University of Wageningen, Netherlands, 1983. Handbook of Environmental Data on Organic Chemicals, 2nd Edition, Van Nostrand Reinhold Co.

MK-F, 1987. Phase I Water Quality Assessment Report, DOE/OR/21548-003, December.

MK-F, 1988a. Chemical Soil Investigation Sampling Plan for the Weldon Spring Chemical Plant/Raffinate Pits, DOE/OR/21548-013, May.

MK-F, 1988b. Phase I Chemical Soil Investigation Data Report for the Weldon Spring Chemical Plant/Raffinate Pits, DOE/OR/21548-016, June.

U.S. Department of Agriculture, 1982. Soil Survey of St. Charles County, Missouri, Soil Conservation Service, May.

APPENDIX A
SOIL SAMPLE DESCRIPTION

SOIL SAMPLE DESCRIPTION

MATERIAL STAGING AREA

Sample Number: SO-51150,101207
Location: Material Staging Area
Analysis Performed: Metals, inorganics, nitroaromatics, pH, % moisture
Sample Description:

0 to 2'	6 inches of topsoil, 1.5 feet of gray-brown mottled clay
2 to 4'	2 feet gray-brown mottled clay
4 to 6'	2 feet gray-brown mottled clay
6 to 8'	6 inches gray-brown mottled clay, 1.5 feet brown clay moist
8 to 10'	2 feet wet brown clay

Sample Number: SO-51137,101068
Location: Material Staging Area
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides, pH, % moisture
Sample Description:

0 to 2'	8 inches topsoil, 16 inches red-brown clay
2 to 4'	2 feet gray-brown mottled clay
4 to 6'	2 feet gray-brown mottled clay
6 to 8'	6 inches brown clay with black chunks; 18 inches moist brown clay
8 to 10'	6 inches brown clay; 18 inches gray-brown mottled clay
10 to 12'	2 feet gray-brown mottled clay

Sample Description: SO-51500,101190
Location: Material Staging Area
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides, pH, % moisture
Sample Description:

0 to 2'	1 foot top soil, 1 foot red-brown clay
2 to 4'	2 feet dry gray-brown mottled clay
4 to 6'	2 feet dry gray-brown mottled clay
6 to 8'	1 foot dry gray-brown mottled clay, 1 foot same but moister with black oxide
8 to 10'	2 feet buff-brown mottled, moist
10 to 12'	18 inches buff-brown mottled, moist; 6 inches brown-black mottled moist

Sample Number: SO-51445,101065
Location: Material Staging Area
Analysis Performed: Metals, inorganics, nitroaromatics, pH, % moisture
Sample Description:

0 to 2'	8 inches topsoil, 16 inches brown-gray clay
2 to 4'	18 inches brown-gray clay, 6 inches dense gray-brown mottled clay
4 to 6'	2 feet gray-brown mottled clay, dry
6 to 8'	2 feet gray-brown mottled clay, dry
8 to 10'	2 feet gray-brown mottled clay, dry
10 to 12'	18 inches gray-brown mottled clay, 6 inches brown clay with black specks, possibly oxide

Sample Number: SO-51360,101175
Location: Material Staging Area
Analysis Performed: Metal, inorganics, nitroaromatics, pH, % moisture.
Sample Description:

0 to 2'	4 inches road rocks, 10 inches brick red clay, 10 inches brown-buff clay
2 to 4'	2 feet dry gray-brown clay
4 to 6'	2 feet dry brown-gray clay
6 to 8'	2 feet brown-gray clay
8 to 10'	2 feet brown-gray clay, gummy

ASH POND DIKE

Sample Number: SO-51180,100335
Location: Ash Pond Dike
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	4 inches of topsoil, 20 inches buff dense but friable clay - glass beads (volcanic)
2 to 4'	20 inches buff clay with more rust color increasing with depth, 4 inches

Sample Number: SO-51125,100260
Location: Ash Pond Dike
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	1 foot topsoil, 1 foot buff to orange loose, dry clay
2 to 4'	8 inches orange dry clay, 8 inches cherty dry clay, 8 inches rusty cherty clay
4 to 6'	2 feet red-rusty, cherty clay
6 to 8'	2 feet red-rusty, cherty clay
8 to 10'	1 foot red-rusty, cherty clay, 1 foot buff-brown, moist clay

Sample Number: SO-51150,100220
Location: Ash Pond Dike
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides
Sample Description:

0 to 2'	2 inches topsoil, 16 inches brown-gray clay, 6 inches brown dry topsoil with chert towards bottom
2 to 4'	2 inches brown topsoil cherts, 22 inches rusty-red clay with 80% chert
4 to 6'	2 feet rusty red clay 80% chert
6 to 8'	2 feet rusty red clay 80% chert
8 to 10'	6 inches rusty red clay 80% chert, 18 inches brown moist clay, gray towards bottom 2 inches

Sample Number: SO-51100,100335
Location: Ash Pond Dike
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides
Sample Description:

0 to 2'	6 inches topsoil - 18 inches gray-brown clay
2 to 4'	2 feet buff friable clay, rust color increases with depth
4 to 6'	2 feet of dense, moist, gray-rust mottled clay, friable at top 6 inches with black specks
6 to 8'	1 foot dense, moist, gray-rust mottled clay, 1 foot chert chunks with clay, chert 80%, clay 20%
8 to 10'	2 feet rusty clay with chert (20%)

Sample Number: SO-51308,100085
Location: Ash Pond Dike
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	1 foot topsoil, organics layer, more topsoil (6 inches), dense gray clay - 6 inches
2 to 4'	1 foot dense gray clay, 6 inches gray clay with Fe oxide stains, 1 inch dry cherty clay with Fe oxide
4 to 6'	1 foot gray with Fe oxide stain increasing with depth to gray/brown mottled in second foot
6 to 8'	2 feet gray-rust moist dense clay
8 to 10'	2 feet gray-rust moist dense clay

SOUTHEAST ISOLATION DIKE

Sample Number: SO-50290,98700
Location: SE Isolation Dike
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	10 inches topsoil, 10 inches gray-brown moist mottled dense clay, 4 inches clay with cherts 50%, friable
2 to 4'	14 inches brown clay with chert, 10 inches brown clay dense and friable
4 to 6'	2 feet brown-gray mottled clay, moist & dense
6 to 8'	1 foot gray-brown mottled clay, 6 inches dark gray dense clay, 6 inches same with chert

Sample Number: SO-50140,98820
Location: SE Isolation Dike
Analysis Performed: Metals, inorganics nitroaromatics
Sample Description:

0 to 2'	4 inches topsoil, 6 inches chert, 6 inches buff moist clay with 50% chert, 8 inches clay without chert
2 to 4'	20 inches orange-gray mottled, moist clay, 4 inches same but siltier
4 to 6'	2 feet orange-gray mottled moist clay with minor sandy layers
6 to 8'	2 feet orange-gray mottled clay, moist with black specks toward bottom 1 foot

Sample Number: SO-50230,98991
Location: SE Isolation Dike
Analysis Performed: Metals, inorganics nitroaromatics
Sample Description:

0 to 2'	8 inches of topsoil, 16 inches brown-rust mottled clay
2 to 4'	1 foot buff, dense clay, 1 foot buff silty clay, friable
4 to 6'	2 feet buff-gray silty clay
6 to 8'	8 inches buff-gray silty clay, 16 inches buff-gray mottled dense clay

Sample Number: SO-50160,98735
Location: SE Isolation Dike
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides
Sample Description:

0 to 2'	8 inches topsoil, 16 inches gray silty clay
2 to 4'	2 feet dry gray clayey silt
4 to 6'	2 feet dry gray clayey silt
6 to 8'	2 feet gray silty clay - darker at top
8 to 10'	8 inches light gray loose clay, 4 inches dense, moist clay, 12 inches dense orange-gray mottled clay with chert
10 to 12'	2 feet orange-gray mottled clay

Sample Number: SO-50252,98800
Location: SE Isolation Dike
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	4 inches topsoil, 14 inches buff, moist, dense clay, 6 inches buff-gray silty clay, friable
2 to 4'	22 inches buff-gray silty clay, 2 inches of light gray silt
4 to 6'	16 inches brick red-gray mottled clay, inches buff-gray mottled clay
6 to 8'	1 foot buff-gray mottled clay, 6 inches buff-gray mottled with black specks, 6 inches without

ADMINISTRATION BUILDING

Sample Number: SO-49475,99983
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	6 inches topsoil, 18 inches brown dry clay
2 to 4'	2 feet dense brown clay with small rocks
4 to 6'	8 inches brown clay, 16 inches moist soft gray clay
6 to 8'	2 feet gray moist clay
8 to 10'	2 feet gray-brown mottled clay
10 to 12'	2 feet gray-brown mottled clay

Sample Number: SO-49000,100180
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	6 inches of rock fill, 18 inches moist brown clay
2 to 4'	2 feet moist brown clay
4 to 6'	2 feet moist brown-gray clay
6 to 8'	2 feet most gray-brown clay

Sample Number: SO-49000,99985
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics, volatiles, semi-volatiles
Sample Description:

0 to 2'	2 inches topsoil, 6 inches soil with rock fill, 8 inches dry buff clay, 8 inches moist dense buff clay
2 to 4'	2 feet gray-brown mottled clay, moist & dense
4 to 6'	2 feet gray-brown mottled clay
6 to 8'	2 feet gray-brown mottled clay

Sample Number: SO-49000,100295
Location: Administration Building
Analysis Performed Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	4 inches topsoil, 8 inches buff, dry, clay, 12 inches buff-brown mottled, hard clay
2 to 4'	2 feet buff-brown mottled clay - top 8 inches hard, lower 16 inches softer
4 to 6'	2 feet brown-gray mottled clay, moist
6 to 8'	2 feet brown-gray mottled clay, moist

Sample Number: SO-49172,100180
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	6 inches topsoil, 18 inches brown clay-denser and more red towards bottom
2 to 4'	1 foot brown clay, dense, 1 foot brown-gray mottled clay
4 to 6'	2 feet gray-brown clay, with some silty clay layers
6 to 8'	2 feet gray-brown clay, dense

Sample Number: SO-49250,100140
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	6 inches topsoil, 18 inches brown silty clay
2 to 4'	2 feet of brown clay with silty layer (1/2" thick) at 10 inches down
4 to 6'	2 feet brown-gray mottled clay
6 to 8'	2 feet brown-gray mottled clay - dense
8 to 10'	2 feet brown-gray mottled dense clay

Sample Number: SO-49000,100500
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	4 inches topsoil, 20 inches buff dry clay
2 to 4'	2 feet brown-buff, dry clay
4 to 6'	1 foot brown-buff, dry clay, 1 foot moist dense, brown clay
6 to 8'	2 feet sticky moist brown-gray mottled clay
8 to 10'	2 feet sticky moist brown-gray mottled clay
10 to 12'	2 feet moist brown-gray clay

Sample Number: SO-49080,100295
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	4 inches topsoil, 8 inches soft moist, brown clay, 12 inches hard, dense, brown clay
2 to 4'	1 foot hard brown clay, 1 foot hard brown-gray mottled clay
4 to 6'	2 feet brown-gray mottled clay
6 to 8'	2 feet brown-gray mottled clay
8 to 10'	2 feet brown-gray mottled clay - softer at bottom 1 foot

Sample Number: SO-49082,100570
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides
Sample Description:

0 to 2'	6 inches topsoil, 18 inches dry, buff clay
2 to 4'	2 feet dry, brown clay
4 to 6'	1 foot dry brown clay, 1 foot moist brown clay
6 to 8'	2 feet red-brown clay - moist
8 to 10'	2 feet brown-gray mottled clay - moist
10 to 12'	2 feet brown-gray mottled clay
12 to 14'	2 feet gray-brown mottled clay
14 to 16'	2 feet gray-brown mottled clay

Sample Number: SO-49160,100500
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	4 inches topsoil, 4 inches rock fill, 1 foot dry buff clay, 4 inches moist brown clay
2 to 4'	2 feet moist brown clay
4 to 6'	1 foot moist brown clay, 1 foot moist brown-gray clay
6 to 8'	2 feet moist brown-gray clay
8 to 10'	1 foot moist brown-gray clay, 1 foot moist brown clay
10 to 12'	2 feet moist brown clay

Sample Number: SO-49000,100665
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics
Sample Description:

0 to 2'	6 inches topsoil, 8 inches moist clayey dirt, 10 inches dry brown clay
2 to 4'	2 feet dry brown clay
4 to 6'	2 feet dry brown clay
6 to 8'	1 foot dry brown clay, 1 foot moist, red-gray mottled clay
8 to 10'	2 feet moist red-gray mottled clay
10 to 12'	1 foot moist red-gray mottled clay, 1 foot moist brown clay

Sample Number: SO-49101,100500
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides
Sample Description:

0 to 2'	4 inches topsoil, 20 inches dry, buff clay
2 to 4'	2 feet dry brown clay, harder at bottom
4 to 6'	2 feet soft, moist brown clay
6 to 8'	2 feet soft, moist brown-gray mottled clay
8 to 10'	2 feet soft, moist brown-gray mottled clay
10 to 12'	2 feet soft, moist brown-gray mottled clay
12 to 14'	2 feet soft, moist gray-brown mottled clay
14 to 16'	2 feet soft, moist brown-gray mottled clay

Sample Number: SO-49132,100440
Location: Administration Building
Analysis Performed: Metals, inorganics, nitroaromatics, semi-volatiles, PCBs, pesticides
Sample Description:

0 to 2'	4 inches soil, 20 inches brown-gray clay, dense
2 to 4'	2 feet hard brown-gray clay
4 to 6'	2 feet hard brown-gray clay, moist
6 to 8'	2 feet hard brown-gray clay
8 to 10'	2 feet hard brown-gray clay
10 to 12'	2 feet hard brown-gray clay
12 to 14'	1 foot hard brown-gray clay, 1 foot softer brown clay

CONSTRUCTION STAGING AREA

Sample Number:	SO-50800,98150
Location:	Construction Staging Area
Analysis Performed:	Metals, inorganics, nitroaromatics, volatiles, semi-volatiles, PCBs, pesticides, pH, % moisture
Sample Description:	
0 to 7'	12 inches topsoil, gray-brown mottled clay
8 to 15'	gray-brown mottled clay

Sample Number:	SO-50950,98300
Location:	Construction Staging Area
Analysis Performed:	Metals, inorganics, nitroaromatics, volatiles, semi-volatiles, PCBs, pesticides, pH, % moisture
Sample Description:	
0 to 7'	6 inches topsoil, gray-brown mottled clay
8 to 15'	gray-brown mottled clay

APPENDIX B
ANALYTICAL DATA - METALS, INORGANIC ANIONS

TABLE B-1

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - ANIONS

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G)			
		CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-49000,100180-0,2-1187	11/11/87	1.07	12.44	2.68	91.62
SO-49000,100180-2,4-1187	11/11/87	4.40	21.13	1.87	58.11
SO-49000,100180-4,6-1187	11/11/87	1.53	17.60	2.84	28.30
SO-49000,100180-6,8-1187	11/11/87	9.61	19.64	3.59	19.15
SO-49000,100295-0,2-1187	11/11/87	1.93	9.66	4.52	33.57
SO-49000,100295-2,4-1187	11/11/87	12.79	9.76	1.73	163.41
SO-49000,100295-4,6-1187	11/11/87	19.39	12.10	1.40	27.73
SO-49000,100295-6,8-1187	11/11/87	13.09	14.88	5.51	31.91
SO-49000,100500-0,2-1187	11/12/87	1.60	9.72	2.63	39.47
SO-49000,100500-10,12-1187	11/12/87	1.08	7.20	3.48	8.16
SO-49000,100500-2,4-1187	11/12/87	0.46	10.04	1.15	60.38
SO-49000,100500-4,6-1187	11/12/87	0.61	5.99	0.98	37.38
SO-49000,100500-6,8-1187	11/12/87	1.01	7.92	2.89	15.97
SO-49000,100500-8,10-1187	11/12/87	1.09	7.88	1.33	12.13
SO-49000,100665-0,2-1187	11/12/87	2.00	1.88	0.94	41.20
SO-49000,100665-10,12-1187	11/12/87	5.35	13.75	2.04	8.91
SO-49000,100665-2,4-1187	11/12/87	4.84	12.96	3.27	127.31
SO-49000,100665-4,6-1187	11/12/87	2.63	15.65	1.43	136.20
SO-49000,100665-6,8-1187	11/12/87	9.87	9.74	3.01	46.32
SO-49000,100665-8,10-1187	11/12/87	9.58	12.43	2.72	49.83
SO-49000,99985-0,2-1187	11/11/87	2.94	9.28	ND	74.90
SO-49000,99985-2,4-1187	11/11/87	25.74	8.80	7.72	327.44
SO-49000,99985-4,6-1187	11/11/87	48.71	12.54	2.85	59.93
SO-49000,99985-6,8-1187	11/11/87	5.45	16.25	1.81	20.97
SO-49080,100295-0,2-1187	11/12/87	3.34	6.08	2.62	26.25
SO-49080,100295-2,4-1187	11/12/87	2.32	12.30	1.16	76.84
SO-49080,100295-4,6-1187	11/12/87	1.07	13.48	0.54	3.53
SO-49080,100295-6,8-1187	11/12/87	1.20	21.40	1.67	4.30
SO-49080,100295-8,10-1187	11/12/87	0.84	12.86	2.88	8.05
SO-49082,100570-0,2-1187	11/12/87	1.59	7.48	4.31	32.29
SO-49082,100570-10,12-1187	11/12/87	45.3	2.98	6.2	21.34
SO-49082,100570-12,14-1187	11/12/87	1.17	11.15	5.4	17.36
SO-49082,100570-14,16-1187	11/12/87	0.94	6.95	2.47	13.66
SO-49082,100570-2,4-1187	11/12/87	3.09	9.15	1.26	140.7
SO-49082,100570-4,6-1187	11/12/87	4.93	6.11	1.29	106.91
SO-49082,100570-6,8-1187	11/12/87	5.77	8.85	8.2	25.64
SO-49082,100570-8,10-1187	11/12/87	5.17	7.87	2.95	32.61
SO-49101,100500-0,2-1187	11/12/87	1.3	9.53	3.58	34.24
SO-49101,100500-10,12-1187	11/12/87	1.43	1.55	1202.49	8.61
SO-49101,100500-12,14-1187	11/12/87	1.58	1.58	1108.81	12.92
SO-49101,100500-14,16-1187	11/12/87	1.32	1.44	53.9	11.5
SO-49101,100500-2,4-1187	11/12/87	0.93	ND	141.32	88.38
SO-49101,100500-4,6-1187	11/12/87	1.11	1.11	1285.56	7.02
SO-49101,100500-6,8-1187	11/12/87	1.58	1.21	1354.64	6.68

TABLE B-1 (continued)

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - ANIONS

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G)			
		CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-49101,100500-8,10-1187	11/12/87	1.49	1.49	1297.08	6.81
SO-49132,100440-0,2-1187	11/12/87	1.40	4.55	3.27	77.56
SO-49132,100440-10,12-1187	11/12/87	0.85	8.41	2.68	15.48
SO-49132,100440-12,14-1187	11/12/87	0.83	5.13	2.62	13.23
SO-49132,100440-14,16-1187	11/12/87	54.93	2.52	3.49	18.75
SO-49132,100440-2,4-1187	11/12/87	0.83	5.01	1.07	129.93
SO-49132,100440-4,6-1187	11/12/87	0.95	11.19	1.9	16.79
SO-49132,100440-6,8-1187	11/12/87	0.7	12.39	3.39	13.32
SO-49132,100440-8,10-1187	11/12/87	1.06	9.78	8.72	11.19
SO-49160,100500-0,2-1187	11/12/87	3.54	10.06	1.49	46.31
SO-49160,100500-10,12-1187	11/12/87	4.86	10.94	4.13	6.69
SO-49160,100500-2,4-1187	11/12/87	3.87	10.89	2.42	35.93
SO-49160,100500-4,6-1187	11/12/87	5.97	15.45	2.11	5.97
SO-49160,100500-6,8-1187	11/12/87	4.87	14.71	3.68	5.46
SO-49160,100500-8,10-1187	11/12/87	4.40	13.56	2.62	5.35
SO-49172,100180-0,2-1187	11/11/87	9.77	13.49	2.76	170.77
SO-49172,100180-2,4-1187	11/11/87	25.59	12.19	2.66	237.63
SO-49172,100180-4,6-1187	11/11/87	30.12	11.81	1.09	14.94
SO-49172,100180-6,8-1187	11/11/87	26.00	14.26	7.48	16.30
SO-49250,100140-0,2-1187	11/10/87	2.36	10.87	0.82	136.90
SO-49250,100140-2,4-1187	11/10/87	7.88	5.93	1.08	1548.14
SO-49250,100140-4,6-1187	11/10/87	22.58	11.72	4.00	17.94
SO-49250,100140-6,8-1187	11/10/87	1.60	11.66	1.14	30.86
SO-49250,100140-8,10-1187	11/10/87	0.86	12.92	1.80	14.34
SO-49475,99985-0,2-1187	11/10/87	1.82	8.53	12.97	89.22
SO-49475,99985-10,12-1187	11/10/87	4.07	19.39	3.78	15.42
SO-49475,99985-2,4-1187	11/10/87	1.81	5.69	9.86	116.34
SO-49475,99985-4,6-1187	11/10/87	4.17	8.57	2.25	43.04
SO-49475,99985-6,8-1187	11/10/87	5.55	10.75	12.45	25.25
SO-49475,99985-8,10-1187	11/10/87	4.88	13.25	2.85	11.95

TABLE B-1

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - ANIONS

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G)			
		CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-49000,100180-0,2-1187	11/11/87	1.07	12.44	2.68	91.62
SO-49000,100180-2,4-1187	11/11/87	4.40	21.13	1.87	58.11
SO-49000,100180-4,6-1187	11/11/87	1.53	17.60	2.84	28.30
SO-49000,100180-6,8-1187	11/11/87	9.61	19.64	3.59	19.15
SO-49000,100295-0,2-1187	11/11/87	1.93	9.66	4.52	33.57
SO-49000,100295-2,4-1187	11/11/87	12.79	9.76	1.73	163.41
SO-49000,100295-4,6-1187	11/11/87	19.39	12.10	1.40	27.73
SO-49000,100295-6,8-1187	11/11/87	13.09	14.88	5.51	31.91
SO-49000,100500-0,2-1187	11/12/87	1.60	9.72	2.63	39.47
SO-49000,100500-10,12-1187	11/12/87	1.08	7.20	3.48	8.16
SO-49000,100500-2,4-1187	11/12/87	0.46	10.04	1.15	60.38
SO-49000,100500-4,6-1187	11/12/87	0.61	5.99	0.98	37.38
SO-49000,100500-6,8-1187	11/12/87	1.01	7.92	2.89	15.97
SO-49000,100500-8,10-1187	11/12/87	1.09	7.88	1.33	12.13
SO-49000,100665-0,2-1187	11/12/87	2.00	1.88	0.94	41.20
SO-49000,100665-10,12-1187	11/12/87	5.35	13.75	2.04	8.91
SO-49000,100665-2,4-1187	11/12/87	4.84	12.96	3.27	127.31
SO-49000,100665-4,6-1187	11/12/87	2.63	15.65	1.43	136.20
SO-49000,100665-6,8-1187	11/12/87	9.87	9.74	3.01	46.32
SO-49000,100665-8,10-1187	11/12/87	9.58	12.43	2.72	49.83
SO-49000,99985-0,2-1187	11/11/87	2.94	9.28	ND	74.90
SO-49000,99985-2,4-1187	11/11/87	25.74	8.80	7.72	327.44
SO-49000,99985-4,6-1187	11/11/87	48.71	12.54	2.85	59.93
SO-49000,99985-6,8-1187	11/11/87	5.45	16.25	1.81	20.97
SO-49080,100295-0,2-1187	11/12/87	3.34	6.08	2.62	26.25
SO-49080,100295-2,4-1187	11/12/87	2.32	12.30	1.16	76.84
SO-49080,100295-4,6-1187	11/12/87	1.07	13.48	0.54	3.53
SO-49080,100295-6,8-1187	11/12/87	1.20	21.40	1.67	4.30
SO-49080,100295-8,10-1187	11/12/87	0.84	12.86	2.88	8.05
SO-49082,100570-0,2-1187	11/12/87	1.59	7.48	4.31	32.29
SO-49082,100570-10,12-1187	11/12/87	45.3	2.98	6.2	21.34
SO-49082,100570-12,14-1187	11/12/87	1.17	11.15	5.4	17.36
SO-49082,100570-14,16-1187	11/12/87	0.94	6.95	2.47	13.66
SO-49082,100570-2,4-1187	11/12/87	3.09	9.15	1.26	140.7
SO-49082,100570-4,6-1187	11/12/87	4.93	6.11	1.29	106.91
SO-49082,100570-6,8-1187	11/12/87	5.77	8.85	8.2	25.64
SO-49082,100570-8,10-1187	11/12/87	5.17	7.87	2.95	32.61
SO-49101,100500-0,2-1187	11/12/87	1.3	9.53	3.58	34.24
SO-49101,100500-10,12-1187	11/12/87	1.43	1.55	1202.49	8.61
SO-49101,100500-12,14-1187	11/12/87	1.58	1.58	1108.81	12.92
SO-49101,100500-14,16-1187	11/12/87	1.32	1.44	53.9	11.5
SO-49101,100500-2,4-1187	11/12/87	0.93	ND	141.32	88.38
SO-49101,100500-4,6-1187	11/12/87	1.11	1.11	1285.56	7.02
SO-49101,100500-6,8-1187	11/12/87	1.58	1.21	1354.64	6.68

TABLE B-1 (continued)

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - ANIONS

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G)			
		CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-49101,100500-8,10-1187	11/12/87	1.49	1.49	1297.08	6.81
SO-49132,100440-0,2-1187	11/12/87	1.40	4.55	3.27	77.56
SO-49132,100440-10,12-1187	11/12/87	0.85	8.41	2.68	15.48
SO-49132,100440-12,14-1187	11/12/87	0.83	5.13	2.62	13.23
SO-49132,100440-14,16-1187	11/12/87	54.93	2.52	3.49	18.75
SO-49132,100440-2,4-1187	11/12/87	0.83	5.01	1.07	129.93
SO-49132,100440-4,6-1187	11/12/87	0.95	11.19	1.9	16.79
SO-49132,100440-6,8-1187	11/12/87	0.7	12.39	3.39	13.32
SO-49132,100440-8,10-1187	11/12/87	1.06	9.78	8.72	11.19
SO-49160,100500-0,2-1187	11/12/87	3.54	10.06	1.49	46.31
SO-49160,100500-10,12-1187	11/12/87	4.86	10.94	4.13	6.69
SO-49160,100500-2,4-1187	11/12/87	3.87	10.89	2.42	35.93
SO-49160,100500-4,6-1187	11/12/87	5.97	15.45	2.11	5.97
SO-49160,100500-6,8-1187	11/12/87	4.87	14.71	3.68	5.46
SO-49160,100500-8,10-1187	11/12/87	4.40	13.56	2.62	5.35
SO-49172,100180-0,2-1187	11/11/87	9.77	13.49	2.76	170.77
SO-49172,100180-2,4-1187	11/11/87	25.59	12.19	2.66	237.63
SO-49172,100180-4,6-1187	11/11/87	30.12	11.81	1.09	14.94
SO-49172,100180-6,8-1187	11/11/87	26.00	14.26	7.48	16.30
SO-49250,100140-0,2-1187	11/10/87	2.36	10.87	0.82	136.90
SO-49250,100140-2,4-1187	11/10/87	7.88	5.93	1.08	1548.14
SO-49250,100140-4,6-1187	11/10/87	22.58	11.72	4.00	17.94
SO-49250,100140-6,8-1187	11/10/87	1.60	11.66	1.14	30.86
SO-49250,100140-8,10-1187	11/10/87	0.86	12.92	1.80	14.34
SO-49475,99985-0,2-1187	11/10/87	1.82	8.53	12.97	89.22
SO-49475,99985-10,12-1187	11/10/87	4.07	19.39	3.78	15.42
SO-49475,99985-2,4-1187	11/10/87	1.81	5.69	9.86	116.34
SO-49475,99985-4,6-1187	11/10/87	4.17	8.57	2.25	43.04
SO-49475,99985-6,8-1187	11/10/87	5.55	10.75	12.45	25.25
SO-49475,99985-8,10-1187	11/10/87	4.88	13.25	2.85	11.95

TABLE B-2

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - METALS

Location	Date Sampled	Concentration (UG/G)																							
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
SO-49000,100180-0,2-1187	11/11/87	14481	ND	16.6	248	1.2	ND	13627	21.1	17.6	9.5	21459	23.9	6.5	2857	1440	ND	15.6	ND	ND	ND	ND	ND	47.2	23.2
SO-49000,100180-2,4-1187	11/11/87	30009	ND	34	98	1	ND	4584	31.8	ND	10.8	24651	4.5	11.2	3494	86.4	ND	14.3	ND	ND	ND	ND	ND	49.8	33.8
SO-49000,100180-4,6-1187	11/11/87	13658	ND	16.7	95.2	0.9	ND	3667	17.1	ND	7.3	14655	6.9	ND	2166	74.4	ND	10.5	ND	ND	ND	ND	ND	33.8	18.5
SO-49000,100180-6,8-1187	11/11/87	16070	ND	8.9	80	0.9	ND	3249	37.2	ND	8.4	16267	8.2	ND	2075	104	ND	15.7	ND	ND	ND	ND	ND	37.4	21.4
SO-49000,100295-0,2-1187	11/11/87	11272	ND	13.0	234	0.9	0.7	3602	19.0	15.5	8.0	18300	20.7	6.7	2086	1514	ND	15.0	ND	ND	ND	ND	ND	40.5	28.3
SO-49000,100295-2,4-1187	11/11/87	13665	ND	22.7	127	0.9	ND	3594	21.9	17.3	8.2	17975	14.3	ND	2297	341	ND	11.7	ND	ND	ND	ND	ND	41.7	19.2
SO-49000,100295-4,6-1187	11/11/87	11027	ND	20.7	223	0.8	ND	3115	1215	ND	7.5	12948	7.5	ND	1715	38.7	ND	9.2	ND	ND	ND	ND	ND	32.7	14.2
SO-49000,100295-6,8-1187	11/11/87	15873	ND	31.7	59.0	1.2	ND	3365	23.8	ND	10.7	19988	11.5	ND	2022	93.2	ND	15.4	ND	ND	ND	ND	ND	44.4	21.4
SO-49000,100500-0,2-1187	11/12/87	14758	6.0	10.2	253	0.9	1.5	3472	25.2	11.4	20.8	20135	11.4	15.2	3615	705	0.1	27.2	952	ND	1.5	ND	ND	43.5	49.0
SO-49000,100500-10,12-1187	11/12/87	12046	ND	7.3	57.88	1.0	ND	3455	14.2	6.7	10.4	13125	15.1	ND	1704	46	ND	12.0	ND	ND	ND	ND	ND	42.2	16.6
SO-49000,100500-2,4-1187	11/12/87	10638	ND	7.9	195	0.7	0.9	2113	17.9	11.3	13.2	14916	14.5	8.9	2101	802	ND	12.5	ND	ND	1.3	ND	ND	33.9	27.0
SO-49000,100500-4,6-1187	11/12/87	25260	ND	2.3	299	1.2	1.2	3151	31.3	27.5	14.2	27605	35.8	13.6	3054	1747	ND	18.7	666	ND	2.0	ND	ND	64.4	35.2
SO-49000,100500-6,8-1187	11/12/87	16432	ND	8.8	88	0.8	0.8	3809	19.5	ND	13.5	17551	15.3	ND	23.26	56.6	ND	10.9	ND	ND	1.2	ND	ND	42.2	22.4
SO-49000,100500-8,10-1187	11/12/87	16139	ND	10.0	59.1	0.7	0.6	3201	19.5	ND	11.6	14381	13.2	ND	2031	30.9	ND	13.5	ND	ND	1.0	ND	ND	31.8	22.2
SO-49000,100665-0,2-1187	11/12/87	14044	ND	29.4	142	1.1	ND	3396	21.7	11.2	23	21507	12.4	8.9	2690	534	ND	21.1	717	ND	1.3	ND	ND	38.7	42.7
SO-49000,100665-10,12-1187	11/12/87	12147	ND	10.8	78	0.8	ND	3877	28.3	^ND	8.2	14375	8.9	ND	1690	46.1	ND	15.3	ND	ND	ND	ND	ND	35.5	14.1
SO-49000,100665-2,4-1187	11/12/87	10528	ND	9.2	229	0.8	ND	1611	17.2	10.9	7.5	13813	8.9	8.7	2005	610	ND	18.6	ND	ND	ND	ND	ND	31	28.3
SO-49000,100665-4,6-1187	11/12/87	10717	ND	11.1	164	0.7	ND	1846	21.1	11.1	6.7	15854	12.9	6.6	1691	685	ND	9.7	ND	ND	ND	ND	ND	36	22
SO-49000,100665-6,8-1187	11/12/87	13234	ND	10.9	154	0.6	ND	2563	31.2	6.7	5.9	13607	9.5	7.6	1991	437	ND	14.7	ND	ND	ND	ND	ND	28.9	19.6
SO-49000,100665-8,10-1187	11/12/87	16192	ND	13.8	87	0.8	ND	4090	19	ND	11.6	19324	10.5	ND	1935	50.7	ND	7.9	ND	ND	ND	681	ND	39.3	17.3
SO-49000,99985-0,2-1187	11/11/87	11870	6.0	9.7	157	0.9	ND	4670	21.7	10.0	7.0	17022	10.7	7.5	2667	557	ND	13.2	ND	ND	ND	ND	ND	38.8	28.1
SO-49000,99985-2,4-1187	11/11/87	13528	ND	27.6	261	1.0	ND	4293	22.2	8.9	7.7	18744	15.7	ND	2527	404	ND	13.0	ND	ND	ND	707	ND	46.2	20.9
SO-49000,99985-4,6-1187	11/11/87	11343	ND	14.5	441	0.7	ND	4006	13.0	9.2	7.0	10618	10.2	ND	2141	66.5	ND	8.5	ND	ND	ND	ND	ND	25.8	16.0
SO-49000,99985-6,8-1187	11/11/87	10260	ND	13.2	150	0.9	ND	3361	12.5	ND	7.3	11709	11.4	ND	1772	62	ND	9.5	ND	ND	ND	ND	ND	32.1	15.2
SO-49080,100295-0,2-1187	11/12/87	16547	ND	7.6	169	0.8	0.8	3770	22.9	ND	13.4	18015	13.5	7.0	2601	99	ND	13.6	ND	ND	1.4	ND	ND	38.9	27.4
SO-49080,100295-2,4-1187	11/12/87	15103	ND	7.1	112	0.8	ND	2925	17.6	ND	9.5	14045	14.6	ND	2234	78.8	ND	11.5	ND	ND	ND	ND	ND	27.0	22.9
SO-49080,100295-4,6-1187	11/12/87	18771	ND	3.9	113	1.2	0.5	2815	19.4	8.7	10.6	16192	11.7	ND	2515	81.4	ND	15.2	682	ND	ND	ND	ND	31.0	28.5
SO-49080,100295-6,8-1187	11/12/87	14060	ND	4.4	110	1.2	0.6	3013	14.2	ND	7.7	10736	10.6	ND	1961	55.1	ND	12.3	ND	ND	ND	ND	ND	17.2	20.6
SO-49080,100295-8,10-1187	11/12/87	14231	7.6	8.1	163	1.4	ND	3371	18.1	23.8	8.7	14063	15.9	ND	1959	238	ND	16.5	ND	ND	ND	ND	ND	27.3	20.0
SO-49082,100570-0,2-1187	11/12/87	8681	ND	16.5	220	0.8	ND	2878	17	8	15.9	17188	6.3	6.2	2680	459	ND	17.7	ND	ND	ND	ND	ND	27.6	41.1
SO-49082,100570-10,12-1187	11/12/87	12361	ND	16	38	0.8	ND	3195	24.2	ND	6.2	9399	9.2	ND	1583	23	ND	14.4	ND	ND	ND	ND	ND	24.2	15
SO-49082,100570-12,14-1187	11/12/87	11897	ND	8.7	40.9	1.2	ND	4065	14.4	ND	6.3	8371	7.2	ND	1842	20	ND	11.3	ND	ND	ND	ND	ND	21.8	14.4

TABLE B-2 (continued)

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - METALS

Location	Date Sampled	Concentration (UG/G)																						
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
SO-49082,100570-14,16-1187	11/12/87	13055	ND	10.6	39.8	1.3	ND	3932	34	14.2	8.2	11065	4.2	ND	1895	64	ND	23.5	ND	ND	ND	ND	ND	19.3	19.4
SO-49082,100570-2,4-1187	11/12/87	7401	ND	10	175	0.8	ND	1865	16	7.9	36.5	13910	7.7	ND	1830	611	ND	14.2	ND	ND	ND	ND	ND	30	26.4
SO-49082,100570-4,6-1187	11/12/87	13687	ND	13.6	128	0.8	ND	2532	64	9.3	8.3	15543	7.5	6.1	2074	246	ND	35	ND	ND	ND	ND	ND	31.8	25.7
SO-49082,100570-6,8-1187	11/12/87	13101	ND	21.5	76	ND	ND	3820	22.4	ND	8.7	15895	10.9	ND	2025	49.1	ND	11.2	ND	ND	ND	ND	ND	34.2	17
SO-49082,100570-8,10-1187	11/12/87	13498	ND	25.1	56.4	1.2	ND	3814	25.2	ND	13.5	20020	12.7	ND	1846	32.6	ND	15.6	ND	ND	ND	ND	ND	60	18.7
SO-49101,100500-0,2-1187	11/12/87	9280	ND	7.6	145	0.8	ND	2958	17.6	9	10.5	13738	7.7	7.9	2167	758	ND	19.8	ND	ND	ND	ND	ND	28.5	28.8
SO-49101,100500-10,12-1187	11/12/87	14822	ND	7.8	43.4	1.3	ND	3407	17.2	14.5	11.1	15563	14.3	ND	1978	96	ND	13.3	ND	ND	ND	ND	ND	31.3	21.4
SO-49101,100500-12,14-1187	11/12/87	14091	ND	5.6	37.8	1.7	ND	3931	15.6	8.8	7.6	8130	5.4	6.7	1993	65.5	ND	10	ND	ND	ND	ND	ND	24	18.3
SO-49101,100500-14,16-1187	11/12/87	11756	ND	4.7	106	2.5	0.7	3869	18.7	69.8	11.1	18493	37.8	ND	1994	814	ND	38.3	ND	ND	ND	ND	ND	32.9	24.7
SO-49101,100500-2,4-1187	11/12/87	19819	ND	11.2	178	1	ND	2427	27.6	10.1	10.5	18707	5	10.8	2485	433	ND	15.5	ND	ND	ND	ND	ND	39.7	29.1
SO-49101,100500-4,6-1187	11/12/87	11741	ND	10	36	0.6	ND	3140	13.9	6.9	7.6	11353	7.3	ND	1835	48.8	ND	8.7	ND	ND	ND	ND	ND	24.8	15.5
SO-49101,100500-6,8-1187	11/12/87	11584	ND	11.6	38.1	0.9	ND	3566	15.2	ND	10	15053	10.7	ND	1804	74.5	ND	8.4	ND	ND	ND	ND	ND	36.4	14.8
SO-49101,100500-8,10-1187	11/12/87	14569	ND	14.4	37.8	1.1	ND	4101	16.5	ND	11.4	14507	7.7	ND	2112	100	ND	10.3	ND	ND	ND	ND	ND	27.3	19.6
SO-49132,100440-0,2-1187	11/12/87	13343	7.2	8.7	157	0.9	0.9	14707	24.4	8.9	11.3	16049	19.2	ND	3831	360	ND	16.0	583	ND	1.2	ND	ND	36.4	35.3
SO-49132,100440-10,12-1187	11/12/87	13601	ND	2.9	56.8	1.1	ND	3444	14.1	ND	5.6	9001	4.4	ND	1944	73.5	ND	9	ND	ND	ND	ND	ND	9.6	19.6
SO-49132,100440-12,14-1187	11/12/87	9493	ND	8	153	1.2	ND	3522	10.3	12.6	11.4	11306	30.4	ND	1704	805	ND	26.3	ND	ND	ND	ND	ND	24.2	14.7
SO-49132,100440-14,16-1187	11/12/87	12524	ND	14.9	59.4	1.2	ND	3425	17.5	ND	10.9	20505	8.3	ND	1809	173	ND	20.9	ND	ND	ND	ND	ND	38.3	20.2
SO-49132,100440-2,4-1187	11/12/87	12004	ND	9.2	53.5	0.8	ND	3075	16.6	ND	8.9	14722	15.6	ND	2003	62	ND	10.0	ND	ND	ND	ND	ND	28.7	18.5
SO-49132,100440-4,6-1187	11/12/87	17310	7.4	10.8	82	1.7	ND	3214	35.7	8.5	13.2	25155	18.5	ND	2113	133	ND	15.5	ND	ND	1.3	ND	ND	51.1	25.4
SO-49132,100440-6,8-1187	11/12/87	10290	7	4.4	67	1.2	0.6	3173	10.5	14.4	5.6	6217	12.2	ND	1668	382	ND	14.7	ND	ND	ND	ND	ND	7.2	15.1
SO-49132,100440-8,10-1187	11/12/87	10114	8	4.9	56.3	1.4	ND	3040	13.3	ND	8.2	11970	12.1	ND	1620	92	ND	10.4	ND	ND	ND	ND	ND	23.6	17.3
SO-49160,100500-0,2-1187	11/12/87	11417	ND	26.3	172	0.8	ND	14041	24.9	8.5	10.2	14578	10.4	7.2	4269	485	ND	16.8	ND	ND	1.3	ND	ND	32.6	27.6
SO-49160,100500-10,12-1187	11/12/87	18716	ND	14.8	89.4	1.9	ND	3770	51.7	13.4	110	18363	9.2	6.2	2250	135	ND	38.1	ND	ND	ND	ND	ND	39.5	28.1
SO-49160,100500-2,4-1187	11/12/87	18074	ND	7.7	129	1.3	ND	3012	35	7.9	13.3	31091	29	6.7	2293	331	ND	22.7	680	ND	1.6	ND	ND	71.3	25.9
SO-49160,100500-4,6-1187	11/12/87	16175	ND	9.8	114	0.7	ND	3066	23.3	6.3	9.2	14419	11.9	ND	2288	81	ND	12.3	620	ND	ND	ND	ND	29.8	24.5
SO-49160,100500-6,8-1187	11/12/87	10407	ND	8.9	105	0.7	ND	2979	17.1	ND	67.5	9511	3.9	ND	1780	79	ND	10.8	ND	ND	ND	ND	ND	19.3	14.8
SO-49160,100500-8,10-1187	11/12/87	12298	ND	16.2	125	1.3	ND	3336	23.8	23.3	80	13285	7	ND	1891	315	ND	20.1	ND	ND	ND	ND	ND	28.9	17.8
SO-49172,100180-0,2-1187	11/11/87	15763	ND	16.2	219	1.0	ND	3851	33.6	7.6	10.7	20970	13.1	ND	2437	263	ND	15.2	ND	ND	ND	ND	ND	43.3	24.5
SO-49172,100180-2,4-1187	11/11/87	15123	ND	23.0	155	0.9	ND	3162	19.0	ND	14.5	17231	4.4	27.7	2102	53.4	ND	10.4	ND	ND	ND	ND	ND	35.0	20.0
SO-49172,100180-4,6-1187	11/11/87	13699	ND	16.4	470	0.8	ND	3114	16.3	ND	11.3	14325	4.3	6.9	2010	51	0.12	9.9	ND	ND	ND	ND	ND	38.1	19.1
SO-49172,100180-6,8-1187	11/11/87	16667	ND	16.5	159	1	ND	2900	18.3	6.7	8.5	13851	4.3	ND	2277	77	ND	12.2	ND	ND	ND	ND	ND	28.8	24.1
SO-49250,100140-0,2-1187	11/10/87	11526	ND	22.9	228	1	ND	4113	29.1	10.2	9.4	18636	12.8	6.9	2461	707	ND	12.8	622	ND	ND	ND	ND	39.5	33.1
SO-49250,100140-2,4-1187	11/10/87	14333	ND	10.1	198	1	ND	2627	20	ND	7.2	19172	9.9	ND	1731	153	ND	10.5	ND	ND	ND	ND	ND	42.8	16.5
SO-49250,100140-4,6-1187	11/10/87	14315	ND	16.4	198	1	ND	2624	19.9	ND	7.2	11344	5.1	ND	2030	30.1	ND	10.1	ND	ND	ND	ND	ND	23.3	18.3

TABLE B-2 (continued)

ADMINISTRATION BUILDING AREA IRA SOILS RESULTS - METALS

Location	Date Sampled	Concentration (UG/G)																						
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
SO-49250,100140-6,8-1187	11/10/87	12953	ND	8.2	123	0.9	ND	2916	15.6	ND	6.8	12108	5.7	ND	1613	30.3	ND	9.4	ND	ND	ND	ND	ND	36.8	14.7
SO-49250,100140-8,10-1187	11/10/87	10344	ND	14.1	196	1.3	ND	2862	14.8	9	6.6	17504	26.5	ND	1429	233	ND	10.1	ND	ND	ND	ND	ND	38.5	12.3
SO-49475,99985-0,2-1187	11/10/87	14329	ND	23.4	184	1.2	0.8	11523	21.8	12.5	17.9	22536	17	8.8	4364	771	ND	189	904	ND	ND	ND	ND	42.6	51.5
SO-49475,99985-10,12-1187	11/10/87	12009	ND	9	64	1.1	ND	3462	14.4	ND	7.8	11338	4.9	ND	1442	57.2	ND	9.4	ND	ND	ND	ND	ND	32.3	12.3
SO-49475,99985-2,4-1187	11/10/87	13701	ND	16.6	246	1.1	0.6	18408	21.4	16.2	15.4	22158	26.5	6.9	2405	1176	ND	15.3	ND	ND	ND	ND	ND	47.8	37.5
SO-49475,99985-4,6-1187	11/10/87	11682	ND	16.8	22.3	1.1	0.7	15788	20.3	10.1	22.1	18389	126	6.8	2499	304	ND	17.5	ND	ND	ND	ND	ND	38.4	53.5
SO-49475,99985-6,8-1187	11/10/87	8271	ND	7.1	230	0.6	ND	2945	20.1	ND	11.4	5296	5.8	ND	1545	63	ND	13	ND	ND	ND	ND	ND	19.7	23.3
SO-49475,99985-8,10-1187	11/10/87	12095	ND	8.2	92.4	0.9	ND	3333	14.8	7.1	5.5	8795	8.8	ND	1435	85	ND	7.4	ND	ND	ND	ND	ND	25	13.2

TABLE B-3

Ash Pond Dike IRA Soils Results - Anions

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G) CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-51100,100335-0,2-1187	11/09/87	3.71	5.95	6.76	26.76
SO-51100,100335-2,4-1187	11/09/87	4.09	1.75	10.67	79.55
SO-51100,100335-4,6-1187	11/09/87	3.93	9.27	2.29	26.67
SO-51100,100335-6,8-1187	11/09/87	4.17	7.71	1.87	23.81
SO-51100,100335-8,10-1187	11/09/87	3.37	9.22	4.42	11.5
SO-51125,100260-0,2-1187	11/09/87	4.67	1.29	1.57	21.64
SO-51125,100260-2,4-1187	11/09/87	0.99	1.5	1.35	19.47
SO-51125,100260-4,6-1187	11/09/87	4.01	5.35	1.76	17.97
SO-51125,100260-6,8-1187	11/09/87	4.97	5.52	96.47	12.29
SO-51125,100260-8,10-1187	11/09/87	4.14	10.38	5.3	7.48
SO-51150,100220-0,2-1187	11/09/87	5.71	4.82	2.20	42.09
SO-51150,100220-2,4-1187	11/09/87	2.74	4.85	5.53	26.81
SO-51150,100220-4,6-1187	11/09/87	4.16	7.29	3.99	25.66
SO-51150,100220-6,8-1187	11/09/87	4.36	8.98	2.13	25.55
SO-51150,100220-8,10-1187	11/09/87	4.44	7.62	8.86	26.05
SO-51180,100335-0,2-1187	11/09/87	2.39	8.05	1.66	123.51
SO-51180,100335-2,4-1187	11/09/87	3.51	9.08	2.89	150.93
SO-51308,100085-0,2-1187	11/09/87	5.58	4.39	4.46	17.98
SO-51308,100085-2,4-1187	11/09/87	1.55	ND	0.89	58.63
SO-51308,100085-4,6-1187	11/09/87	3.53	1.87	1.74	37.97
SO-51308,100085-6,8-1187	11/09/87	1.53	ND	3.38	97.77
SO-51308,100085-8,10-1187	11/09/87	1.48	ND	18.23	62.20

TABLE B-4

Ash Pond Dike IRA Soils Results - Metals

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G)																						
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	TL	V
SO-51100,100335-0,2-1187	11/09/87	14142	ND	21.2	284	1	1.5	3945	20.6	15.6	14.3	20464	19.6	7.5	2290	1546	ND	17.3	805	ND	1.27	ND	ND	42.7
SO-51100,100335-2,4-1187	11/09/87	12294	ND	7.6	192	0.7	0.7	2260	18.4	12.3	11.9	18181	18.1	7.3	2090	860	ND	15.8	600	ND	ND	ND	ND	37.1
SO-51100,100335-4,6-1187	11/09/87	21184	ND	5	162	1.2	0.9	3281	24.5	36	9.8	20037	18.2	9.2	2473	865	ND	14.3	ND	ND	ND	ND	ND	42.7
SO-51100,100335-6,8-1187	11/09/87	12164	ND	8	105	0.9	0.8	3311	15.7	ND	8.3	16991	12.7	ND	1850	110	ND	8.1	ND	ND	ND	ND	ND	40.1
SO-51100,100335-8,10-1187	11/09/87	15849	ND	10.6	206	3	0.8	5261	21.2	17.4	20.6	32122	16.4	18.1	2829	933	ND	67.2	ND	ND	ND	ND	ND	49.7
SO-51125,100260-0,2-1187	11/09/87	12164	ND	21.1	175	0.9	0.8	1655	17.8	18.2	11.2	19474	20.4	6.9	1860	1345	ND	17.3	641	ND	ND	ND	ND	41.9
SO-51125,100260-2,4-1187	11/09/87	11004	ND	18.7	120	0.8	ND	1579	18.6	6.9	8.9	16868	6.3	ND	1454	497	ND	11.5	ND	ND	ND	ND	ND	36.2
SO-51125,100260-4,6-1187	11/09/87	25244	ND	11.8	103	1.1	0.8	5337	27.2	ND	13	26286	5.2	8	3128	55	ND	24.4	ND	ND	ND	ND	ND	48.7
SO-51125,100260-6,8-1187	11/09/87	19761	ND	20.9	1.6	0.8	5222	25	7.8	15.4	30548	20.9	ND	2769	161	ND	35.9	ND	ND	ND	ND	ND	ND	49.7
SO-51125,100260-8,10-1187	11/09/87	12591	ND	22.2	108	2.8	0.7	3321	19	8.3	19.2	20113	7.9	ND	2061	352	ND	41.9	ND	ND	ND	ND	ND	39.8
SO-51150,100220-0,2-1187	11/09/87	12019	ND	10.8	208	1	ND	2501	17.1	9.5	12.4	18219	12.2	ND	2175	633	ND	14.2	ND	ND	ND	ND	ND	40
SO-51150,100220-2,4-1187	11/09/87	12678	ND	5.6	85	0.7	ND	3063	23.7	ND	6.5	19623	4	ND	1588	53.5	ND	9.6	ND	ND	ND	ND	ND	40.5
SO-51150,100220-4,6-1187	11/09/87	19028	ND	25.5	81	0.9	ND	3356	31	ND	8.5	22677	4.7	2059	48	ND	15	ND	ND	ND	ND	ND	44.6	48.9
SO-51150,100220-6,8-1187	11/09/87	13236	ND	25.7	66	ND	ND	2970	16.5	ND	8.7	17780	6.66	1623	37	ND	17	ND	ND	ND	ND	ND	27.4	55.8
SO-51150,100220-8,10-1187	11/09/87	11947	ND	19.8	69	0.9	ND	2996	15	ND	12.4	17502	11.4	ND	1687	78.1	ND	19.5	ND	ND	ND	ND	ND	29.4
SO-51180,100335-0,2-1187	11/09/87	13859	ND	7.2	188	1	0.6	2642	20	10.8	13.4	18111	8.2	11.7	2627	342	ND	19.8	711	ND	ND	ND	ND	36.8
SO-51180,100335-2,4-1187	11/09/87	11957	ND	4.6	239	1	0.6	2363	19.5	10	12.7	16776	8.5	8.5	2437	440	ND	14.2	ND	ND	ND	ND	ND	34.5
SO-51308,100085-0,2-1187	11/09/87	11767	ND	8.65	131	0.7	0.6	3350	15.9	ND	9.8	13542	14	ND	1317	340	ND	9.2	ND	ND	ND	ND	ND	31.9
SO-51308,100085-2,4-1187	11/09/87	8343	ND	5.8	31	0.7	ND	1073	9.7	ND	9.1	5198	8.7	ND	615	138	ND	5.6	ND	ND	ND	ND	ND	13.4
SO-51308,100085-4,6-1187	11/09/87	11246	ND	9.01	84	1.2	0.6	2844	15.9	12.3	8.9	9690	9.7	ND	1448	579	ND	9.7	ND	ND	ND	ND	ND	23.9
SO-51308,100085-6,8-1187	11/09/87	13261	ND	13.4	48	1.3	0.6	1266	17.8	13	9.3	22249	11.7	ND	1015	283	ND	8.4	ND	ND	ND	ND	ND	44.6
SO-51308,100085-8,10-1187	11/09/87	11840	ND	11.53	39	0.7	ND	ND	13.4	12.4	5.9	17159	8.6	ND	711	220	ND	5.8	ND	ND	ND	ND	ND	29.9

TABLE B-5

Material Staging Area IRA Soils Results - Anions

Location	Date Sampled	Concentration (UG/G)			
		Chloride	Flouride	Nitrate	Sulfate
SO-51137,101068-0,2-1187	11/06/87	ND	2.79	0.85	15.31
SO-51137,101068-10,12-1187	11/06/87	ND	9.49	2.43	17.89
SO-51137,101068-2,4-1187	11/06/87	ND	7.92	0.79	82
SO-51137,101068-4,6-1187	11/06/87	ND	6.34	1.27	46.92
SO-51137,101068-6,8-1187	11/06/87	ND	8.11	1.33	38.49
SO-51137,101068-8,10-1187	11/06/87	3.42	7.94	1.83	29.33
SO-51150,101207-0,2-1187	11/06/87	ND	2.1	1.46	15.72
SO-51150,101207-2,4-1187	11/06/87	ND	6.69	0.89	148.32
SO-51150,101207-4,6-1187	11/06/87	5.13	5.13	0.89	90.26
SO-51150,101207-6,8-1187	11/06/87	ND	7.97	1.57	24.83
SO-51150,101207-8,10-1187	11/06/87	ND	8.83	1.39	17.65
SO-51360,101175-0,2-1187	11/06/87	ND	3.42	0.94	97.85
SO-51360,101175-2,4-1187	11/06/87	ND	8.56	0.79	78.29
SO-51360,101175-4,6-1187	11/06/87	ND	4.96	0.69	79.35
SO-51360,101175-6,8-1187	11/06/87	5.43	4.72	1.18	52.31
SO-51360,101175-8,10-1187	11/06/87	ND	5.45	1.95	43.51
SO-51445,101065-0,2-1187	11/06/87	ND	4.68	2.22	18.5
SO-51445,101065-10,12-1187	11/06/87	1.25	4.53	ND	8.39
SO-51445,101065-2,4-1187	11/06/87	5.04	12.65	1.68	124.26
SO-51445,101065-4,6-1187	11/06/87	5.7	9.72	1.45	144.05
SO-51445,101065-6,8-1187	11/06/87	5.51	6.72	1.32	52.88
SO-51445,101065-8,10-1187	11/06/87	4.21	6.72	1.82	9.34
SO-51500,101190-0,2-1187	11/06/87	2.04	ND	42.18	1.32
SO-51500,101190-10,12-1187	11/06/87	1.17	5.16	ND	11.37
SO-51500,101190-12,14-1187	11/06/87	1.27	5.54	ND	22.17
SO-51500,101190-2,4-1187	11/06/87	4.36	6.94	1.79	53.59
SO-51500,101190-4,6-1187	11/06/87	7.40	5.55	1.63	164.24
SO-51500,101190-6,8-1187	11/06/87	5.59	3.46	1.56	33.96
SO-51500,101190-8,10-1187	11/06/87	1.43	2.51	ND	26.31

TABLE B-6

Material Staging Area IRA Soils Results - Metals

	DATE SAMPLED	CONCENTRATION (UG/G) LOCATION																					
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V
SO-51137,101068-0,2-1187	11/06/87	20301	ND	7	223	1.2	1.2	2358	35.7	14.2	24	25634	33.5	10.9	3389	648	ND	23.6	1670	ND	2.6	ND	ND	52.3
SO-51137,101068-10,12-1187	11/06/87	13703	ND	7.8	128	1.2	0.9	3018	35.1	8.2	13.5	16587	28.3	ND	1953	107	ND	14.9	821	ND	2.4	ND	ND	46
SO-51137,101068-2,4-1187	11/06/87	10628	ND	7.3	211	0.9	1	1922	27.3	9	14.5	14964	19.6	9.8	2658	402	ND	23.4	1064	ND	2.4	565	ND	31.7
SO-51137,101068-4,6-1187	11/06/87	10744	ND	8.8	161	0.8	ND	1754	21.9	9	6.1	14179	4.1	9	1893	709	ND	12.8	ND	ND	ND	ND	ND	33.2
SO-51137,101068-6,8-1187	11/06/87	16872	ND	8.3	132	0.7	1	2733	24.4	17.9	11.6	17925	23.3	7.2	2161	366	ND	12.4	724	ND	2	ND	ND	35.8
SO-51137,101068-8,10-1187	11/06/87	15607	ND	6.9	359	1	1	2538	19	6.4	13.3	14984	23.1	ND	2102	45.2	ND	12.8	947	ND	2	ND	ND	23.4
SO-51150,101207-0,2-1187	11/06/87	16688	ND	19	147	1.1	1	2295	22.7	14.1	22.8	24443	24.3	9.6	2923	505	ND	20.2	1062	ND	2	582	ND	44.4
SO-51150,101207-2,4-1187	11/06/87	13415	ND	6.7	386	1	1.2	2498	24.3	12	21	20475	18.4	11	3735	653	ND	27.6	1288	ND	1.6	ND	ND	38.5
SO-51150,101207-4,6-1187	11/06/87	7839	ND	4	189	0.8	1	1699	15.6	14.2	14	13672	17.2	7.8	2072	583	ND	14.3	ND	ND	1.5	ND	ND	29.7
SO-51150,101207-6,8-1187	11/06/87	15277	ND	4.7	234	1.3	1.3	2090	25.2	27.1	16	22869	33.7	10.8	2273	1522	ND	18.1	ND	ND	2.2	ND	ND	48.6
SO-51150,101207-8,10-1187	11/06/87	14561	ND	4.2	118	1	0.8	2660	25	9.4	12.8	22327	29.8	ND	1904	379	ND	11	630	ND	1.8	ND	ND	47
SO-51360,101175-0,2-1187	11/06/87	20160	ND	10.1	179	0.9	1.1	11931	27.5	10.8	22	24463	25.4	10	4149	551	ND	18	1398	ND	3	ND	ND	46.8
SO-51360,101175-2,4-1187	11/06/87	13833	ND	8.8	210	1.2	1	15827	13.8	17.4	21.9	20434	26.7	8.9	4861	881	ND	25.3	1447	ND	2.7	ND	ND	42.4
SO-51360,101175-4,6-1187	11/06/87	8777	ND	8.5	194	0.7	1	1695	17.6	8.5	11.3	12629	21.5	7.9	2053	379	ND	15.2	798	ND	2	ND	ND	28
SO-51360,101175-6,8-1187	11/06/87	15031	ND	6.7	136.9	0.8	0.7	1918	20.8	19.9	9.8	15728	14.4	12.3	1877	643	ND	10.4	ND	ND	1.5	ND	ND	36.5
SO-51360,101175-8,10-1187	11/06/87	23935	ND	9.3	104	0.9	ND	3428	26.7	ND	13.7	21584	6.1	11	2519	54.3	ND	12	ND	ND	ND	ND	ND	43.6
SO-51445,101065-0,2-1187	11/06/87	13793	ND	12.1	192	0.9	0.6	5913	21.5	9.2	19.2	18700	17.1	9.9	3337	483	ND	19.8	1030	ND	ND	ND	ND	34.4
SO-51445,101065-10,12-1187	11/06/87	10521	ND	8.1	88.3	0.7	ND	1926	17	6.2	7.6	8521	14.4	ND	1291	598	ND	14.8	759	ND	ND	ND	ND	21.4
SO-51445,101065-2,4-1187	11/06/87	12784	ND	9.6	286	1.1	0.9	2563	24.8	11.2	20.5	23027	18.6	10.4	3274	886	ND	31.6	1410	ND	1.3	ND	ND	39.9
SO-51445,101065-4,6-1187	11/06/87	11546	ND	5.9	207	1.1	0.7	2255	21.2	8.8	14.7	19285	19.8	10.16	2434	402	ND	17.6	1099	ND	1.3	ND	ND	42.4
SO-51445,101065-6,8-1187	11/06/87	8669	ND	7.1	95.3	0.9	ND	1426	16.9	9.1	9.4	15741	18.7	5.9	1332	239	ND	10	603	ND	ND	ND	ND	31.4
SO-51445,101065-8,10-1187	11/06/87	9315	ND	6.8	103	1	ND	1480	26.5	15.5	9.9	17139	22.6	ND	1087	684	ND	12.1	625	ND	ND	ND	ND	40.3
SO-51500,101190-0,2-1187	11/06/87	15518	ND	29.4	159	1	0.7	3176	24.9	13.7	15.6	22265	28.3	8.9	2271	901	ND	14.9	1360	1.3	ND	ND	48.4	39.8
SO-51500,101190-10,12-1187	11/06/87	15103	ND	4.33	57	1.2	0.7	ND	20.5	9.0	11.0	14740	27	7.4	1905	68.9	ND	15.4	139.5	ND	2.7	ND	ND	33.9
SO-51500,101190-12,14-1187	11/06/87	10629	ND	9.6	259	2.0	1.0	2258	23.6	49.2	31.8	16617	36.5	6.2	1848	1005	ND	37.3	1478	ND	3.2	ND	ND	34.8
SO-51500,101190-2,4-1187	11/06/87	13145	ND	6.73	237	1.1	0.7	1823	23	14.8	18.3	19913	21.9	8.8	2987	852	ND	22.6	1488	ND	1.2	ND	ND	41.6
SO-51500,101190-4,6-1187	11/06/87	7842	ND	7.1	116	0.9	ND	1408	17.8	8.3	10.4	11551	20.0	7.0	1746	245	ND	13.5	1039	ND	1.5	ND	ND	27.6
SO-51500,101190-6,8-1187	11/06/87	11182	ND	4.83	117	0.9	0.7	1586	19.5	15.9	8.8	15449	27.7	7.9	1614	656	ND	12.3	1005	ND	1.8	ND	ND	38.1
SO-51500,101190-8,10-1187	11/06/87	26211	ND	6.21	92	1.1	ND	2607	32.2	7.3	11.8	19957	22.2	12.0	2547	140	ND	13.2	1375	ND	2.4	ND	ND	48.1

TABLE B-7

SOUTH EAST ISOLATION DIKE IRA SOILS RESULTS - ANIONS

LOCATION	DATE SAMPLED	CONCENTRATION (UG/G)			
		CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-50140,98820-0,2-1187	11/10/87	4.64	13.98	1.68	61.51
SO-50140,98820-2,4-1187	11/10/87	4.85	17.75	2.05	51.2
SO-50140,98820-4,6-1187	11/10/87	4.55	18.91	1.86	22.39
SO-50140,98820-6,8-1187	11/10/87	5.69	14.82	1.8	20.3
SO-50160,98735-0,2-1187	11/10/87	2.86	4.47	1.74	93.3
SO-50160,98735-10,12-1187	11/10/87	4.36	1.33	1.44	20.9
SO-50160,98735-2,4-1187	11/10/87	3.52	3.34	1.44	23.1
SO-50160,98735-4,6-1187	11/10/87	1.33	ND	24.5	ND
SO-50160,98735-6,8-1187	11/10/87	1.19	1.29	0.63	32.5
SO-50160,98735-8,10-1187	11/10/87	0.945	1.84	0.73	26.1
SO-50230,98991-0,2-1187	11/10/87	5.36	5.14	3.15	13.82
SO-50230,98991-2,4-1187	11/10/87	3.33	13.42	1.56	113.97
SO-50230,98991-4,6-1187	11/10/87	3.57	12.67	1.89	26.74
SO-50230,98991-6,8-1187	11/10/87	3	12.24	2.4	20.56
SO-50252,98800-0,2-1187	11/10/87	3.74	9.51	3.03	26.89
SO-50252,98800-2,4-1187	11/10/87	4.27	1.51	2.71	68.49
SO-50252,98800-4,6-1187	11/10/87	2.62	1.67	1.4	93.04
SO-50252,98800-6,8-1187	11/10/87	5.92	4.59	2.21	15.45
SO-50290,98700-0,2-1187	11/09/87	4.77	5.85	1.99	87.23
SO-50290,98700-2,4-1187	11/09/87	4.6	6.67	2.25	514.76
SO-50290,98700-4,6-1187	11/09/87	4.82	8.38	1.65	263.77
SO-50290,98700-6,8-1187	11/09/87	5.19	7.81	6.71	11297

TABLE B-8

SOUTH EAST ISOLATION DIKE IRA SOILS RESULTS - METALS

LOCATION	DATE SAMPLED	Concentration (UG/G)																					
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl
SO-50140,98820-0,2-1187	11/10/87	9338	ND	6.4	95	1.2	1.4	46097	17.8	7.3	10.6	10384	18	ND	11575	304	ND	10.2	ND	ND	2.1	ND	ND
SO-50140,98820-2,4-1187	11/10/87	14568	ND	5	88.7	1.5	0.8	3816	23.2	8.5	17.2	23129	11.7	ND	2622	107	ND	25.8	ND	ND	ND	ND	ND
SO-50140,98820-4,6-1187	11/10/87	8168	ND	8.3	314	1.7	0.9	3179	12.3	23.6	14.9	12496	13.2	ND	1897	1218	ND	39.3	ND	ND	ND	ND	ND
SO-50140,98820-6,8-1187	11/10/87	10762	ND	4.3	139	2.9	0.8	3383	20.5	7.8	23	20415	6.4	5.9	2187	455	ND	36.9	ND	ND	ND	ND	ND
SO-50160,98735-0,2-1187	11/10/87	10702	ND	5.8	142	0.9	1.1	26698	19.7	12	26	17113	24.4	5.8	3251	8590	ND	15.8	ND	ND	1.3	ND	ND
SO-50160,98735-10,12-1187	11/10/87	10590	ND	6.7	95	0.9	ND	3153	19.2	6.4	13.1	16781	13.9	ND	1425	163	ND	12.3	ND	ND	ND	ND	ND
SO-50160,98735-2,4-1187	11/10/87	6765	7.4	6.2	186	1	0.9	3788	20.5	18.9	8.9	23558	27.1	ND	1950	3126	ND	13.7	ND	ND	1.4	ND	ND
SO-50160,98735-4,6-1187	11/10/87	9052	ND	7.5	129	0.8	0.8	1734	19.7	23.3	17	15067	22.8	ND	1786	2026	ND	16.5	ND	ND	ND	ND	ND
SO-50160,98735-6,8-1187	11/10/87	6951	ND	3.6	108	0.7	ND	823	15	7.8	21	10602	11.5	ND	770	295	ND	10.1	ND	ND	ND	ND	ND
SO-50160,98735-8,10-1187	11/10/87	8105	7.8	7.2	366	1	0.9	1300	26.2	25.7	7.5	22596	25.1	813	3251	ND	13	ND	ND	1.6	ND	ND	62.4
SO-50230,98991-0,2-1187	11/10/87	20315	ND	9.9	168	1.2	1	2156	24.3	6.6	20.5	24543	9.3	9.7	2075	292	ND	19.7	912	ND	ND	ND	ND
SO-50230,98991-2,4-1187	11/10/87	13120	ND	4.2	262	0.9	0.7	2140	21.1	8.2	35.1	17841	8.6	8.8	2650	555	ND	19.1	619	ND	ND	ND	ND
SO-50230,98991-4,6-1187	11/10/87	10245	ND	5.9	171.2	0.8	ND	1900	16.4	5.9	19.6	12902	8.1	7.6	1872	259	ND	10.6	ND	ND	ND	ND	ND
SO-50230,98991-6,8-1187	11/10/87	12409	ND	4.2	202	0.9	0.6	2727	16.4	10.2	26	15179	22.3	6.4	1884	470	ND	8.6	ND	ND	ND	ND	ND
SO-50252,98800-0,2-1187	11/10/87	9191	ND	6.7	159	0.9	ND	6513	17.3	13.9	11.3	16542	21.1	ND	1973	834	ND	16.2	ND	ND	ND	ND	ND
SO-50252,98800-2,4-1187	11/10/87	7166	ND	4.5	121	0.8	ND	1342	14.1	10.4	5.9	12996	18.6	ND	902	626	ND	6.7	ND	ND	ND	ND	ND
SO-50252,98800-4,6-1187	11/10/87	8037	ND	6.4	101	0.9	0.6	2423	19.1	ND	10.6	19895	12	ND	1492	117	ND	8.6	ND	ND	ND	ND	ND
SO-50252,98800-6,8-1187	11/10/87	16496	ND	7.6	98	0.8	ND	3210	13.5	21	11.5	16085	20	ND	15.4	396	ND	15.6	ND	ND	ND	ND	ND
SO-50290,98700-0,2-1187	11/09/87	12552	ND	5.4	139	0.9	ND	6425	15.5	10.8	10.2	14305	16.6	5.7	2132	299	ND	12.4	ND	ND	ND	ND	ND
SO-50290,98700-2,4-1187	11/09/87	9293	ND	6.3	183.6	0.9	0.9	18518	18	9.6	14.3	15893	16.7	6.8	5114	455	ND	16.4	600	ND	1.1	ND	ND
SO-50290,98700-4,6-1187	11/09/87	8866	ND	7.2	98.9	1.2	0.6	4158	14.5	9	14	18989	20.5	ND	2088	426	ND	25	ND	ND	ND	ND	ND
SO-50290,98700-6,8-1187	11/09/87	10355	ND	8.96	96.7	1	ND	5508	15.5	9.3	10.9	14272	8.2	ND	2124	240	ND	18.2	ND	ND	ND	ND	ND

TABLE B-9
CONSTRUCTION STAGING AREA IRA SOILS RESULTS - ANIONS

LOCATION	DATE	CONCENTRATION (UG/G)			
		CHLORIDE	FLOURIDE	NITRATE	SULFATE
SO-50800,98150-0,7-0288	02/09/88	15	10	1.5	75
SO-50800,98150-8,15-0288	02/09/88	10	15	10	10
SO-50950,98300-0,7-0288	02/09/88	30	10	5	75
SO-50950,98300-8,15-0288	02/09/88	10	10	2.0	10

TABLE B-10
CONSTRUCTION STAGING AREA IRA SOILS RESULTS - METALS

LOCATION	DATE SAMPLED	CONCENTRATION (ug/L)																						
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
SO-50800,98150-0,7-0288	02/09/88	8715	ND	14.0	125	0.80	ND	3750	12.9	10.5	8.45	12880	14.3	ND	1981	720	ND	13.2	427	2.93	ND	121	ND	24.6	26.6
SO-50950,98300-0,7-0288	02/09/88	10010	ND	12.71	141	0.79	0.65	2210	15.6	5.97	11.8	16160	11.1	ND	2040	219	ND	12.0	385	1.09	ND	335	ND	29.2	28.1

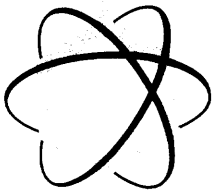
APPENDIX C
ANALYTICAL DETECTION LIMITS

ANALYTICAL PARAMETER	UNITS	DETECTION LIMITS	CATEGORY
Aluminum	ug/g	20	Metals
Antimony	ug/g	6	Metals
Arsenic	ug/g	1	Metals
Barium	ug/g	20	Metals
Beryllium	ug/g	0.5	Metals
Cadmium	ug/g	0.5	Metals
Calcium	ug/g	500	Metals
Chromium	ug/g	1	Metals
Cobalt	ug/g	5	Metals
Copper	ug/g	2.5	Metals
Iron	ug/g	10	Metals
Lead	ug/g	0.5	Metals
Lithium	ug/g	5	Metals
Magnesium	ug/g	500	Metals
Manganese	ug/g	1.5	Metals
Mercury	ug/g	0.1	Metals
Nickel	ug/g	4	Metals
Potassium	ug/g	500	Metals
Selenium	ug/g	0.5	Metals
Silver	ug/g	1	Metals
Sodium	ug/g	500	Metals
Thallium	ug/g	1	Metals
Vanadium	ug/g	5	Metals
Zinc	ug/g	2	Metals
Nitrate	ug/g	0.5	Ions
Sulfate	ug/g	1	Ions
Chloride	ug/g	1.25	Ions
Fluoride	ug/g	1.25	Ions
2,4,6-TNT	ug/g	1.2	Nitroaromatics
2,4 DNT	ug/g	0.75	Nitroaromatics
2,6 DNT	ug/g	1.41	Nitroaromatics
Nitrobenzene	ug/g	1.44	Nitroaromatics
1,3,5-Trinitrobenzene	ug/g	0.57	Nitroaromatics
1,3-Dinitrobenzene	ug/g	0.9	Nitroaromatics
Percent Moisture	prcnt	-	Misc.
pH	units	-	Misc.
Phenol	ug/kg	330	Semi-volatiles
bis(2-Chlorethyl) ether	ug/kg	330	Semi-volatiles
2-Chlorophenol	ug/kg	330	Semi-volatiles
1,3-Dichlorobenzene	ug/kg	330	Semi-volatiles
1,4-Dichlorobenzene	ug/kg	330	Semi-volatiles
Benzyl Alcohol	ug/kg	330	Semi-volatiles
1,2-Dichlorobenzene	ug/kg	330	Semi-volatiles
2-Methylphenol	ug/kg	330	Semi-volatiles
bis(2-Chloroisopropyl) ether	ug/kg	330	Semi-volatiles
4-Methylphenol	ug/kg	330	Semi-volatiles

ANALYTICAL PARAMETER	UNITS	DETECTION LIMITS	CATEGORY
N-Nitro-Dipropylamine	ug/kg	330	Semi-volatiles
Hexachloroethane	ug/kg	330	Semi-volatiles
Nitrobenzene	ug/kg	330	Semi-volatiles
Isophorone	ug/kg	330	Semi-volatiles
2-Nitrophenol	ug/kg	1600	Semi-volatiles
2,4-Dimethyphenol	ug/kg	330	Semi-volatiles
Benzoic Acid	ug/kg	1600	Semi-volatiles
bis(2-Chloroethoxy) methane	ug/kg	330	Semi-volatiles
2,4-Dichlorophenol	ug/kg	330	Semi-volatiles
1,2,4-trichlorobenzene	ug/kg	330	Semi-volatiles
Naphthalene	ug/kg	330	Semi-volatiles
4-Chloroaniline	ug/kg	330	Semi-volatiles
Hexachlorobutadiene	ug/kg	330	Semi-volatiles
4-Chloro-3-methylphenol	ug/kg	330	Semi-volatiles
2-Methylnaphthalene	ug/kg	330	Semi-volatiles
Hexachlorocyclopentadiene	ug/kg	330	Semi-volatiles
2,4,6-Trichlorophenol	ug/kg	330	Semi-volatiles
2,4,5-Trichlorophenol	ug/kg	1600	Semi-volatiles
2-Chloronaphthalene	ug/kg	330	Semi-volatiles
2-Nitroaniline	ug/kg	1600	Semi-volatiles
Dimethyl Phthalate	ug/kg	330	Semi-volatiles
Acenaphthylene	ug/kg	330	Semi-volatiles
2,6-Dinitrotoluene	ug/kg	330	Semi-volatiles
3-Nitroaniline	ug/kg	1600	Semi-volatiles
Acenaphthene	ug/kg	330	Semi-volatiles
2,4-Dinitrophenol	ug/kg	1600	Semi-volatiles
4-Nitrophenol	ug/kg	1600	Semi-volatiles
Dibenzofuran	ug/kg	330	Semi-volatiles
2,4-Dinitrotoluene	ug/kg	330	Semi-volatiles
Diethylphthalate	ug/kg	330	Semi-volatiles
4-Chlorophenyl Phenyl Ether	ug/kg	330	Semi-volatiles
Fluorene	ug/kg	330	Semi-volatiles
4-Nitroaniline	ug/kg	1600	Semi-volatiles
4,6-Dinitro-2-methylphenol	ug/kg	1600	Semi-volatiles
N-nitrosodiphenylamine	ug/kg	330	Semi-volatiles
4-Bromophenyl Phenyl Ether	ug/kg	330	Semi-volatiles
Hexachlorobenzene	ug/kg	330	Semi-volatiles
Pentachlorophenol	ug/kg	1600	Semi-volatiles
Phenanthrene	ug/kg	330	Semi-volatiles
Anthracene	ug/kg	330	Semi-volatiles
Di-n-butylphthalate	ug/kg	330	Semi-volatiles
Fluoranthene	ug/kg	330	Semi-volatiles
Pyrene	ug/kg	330	Semi-volatiles
Butyl Benzyl Phthalate	ug/kg	330	Semi-volatiles
3,3'-Dichlorobenzidine	ug/kg	660	Semi-volatiles
Benzo(a)anthracene	ug/kg	330	Semi-volatiles
Chrysene	ug/kg	330	Semi-volatiles
bis(2-ethylhexyl)phthalate	ug/kg	330	Semi-volatiles
Di-n-octyl Phthalate	ug/kg	330	Semi-volatiles
Benzo(b)fluoranthene	ug/kg	330	Semi-volatiles

ANALYTICAL PARAMETER	UNITS	DETECTION LIMITS	CATEGORY
Benzo(k)fluoranthene	ug/kg	330	Semi-volatiles
Benzo(a)pyrene	ug/kg	330	Semi-volatiles
Indeno(1,2,3-cd)pyrene	ug/kg	330	Semi-volatiles
Dibenzo(a,h)anthracene	ug/kg	330	Semi-volatiles
Benzo(g,h,i)perylene	ug/kg	330	Semi-volatiles
alpha-BHC	ug/kg	8	Pesticide/PCBs
beta-BHC	ug/kg	8	Pesticide/PCBs
delta-BHC	ug/kg	8	Pesticide/PCBs
gamma-BHC (Lindance)	ug/kg	8	Pesticide/PCBs
Heptachlor	ug/kg	8	Pesticide/PCBs
Aldrin	ug/kg	8	Pesticide/PCBs
Heptachlor Epoxide	ug/kg	8	Pesticide/PCBs
Endosulfan I	ug/kg	8	Pesticide/PCBs
Dieldrin	ug/kg	16	Pesticide/PCBs
4,4'-DOE	ug/kg	16	Pesticide/PCBs
Endrin	ug/kg	16	Pesticide/PCBs
Endosulfan II	ug/kg	16	Pesticide/PCBs
4,4'-DOD	ug/kg	16	Pesticide/PCBs
Endosulfan Sulfate	ug/kg	16	Pesticide/PCBs
4,4'-DOT	ug/kg	16	Pesticide/PCBs
Endrin Ketone	ug/kg	16	Pesticide/PCBs
Methxychlor	ug/kg	80	Pesticide/PCBs
alpha-chlordane	ug/kg	80	Pesticide/PCBs
gamma-chlordane	ug/kg	80	Pesticide/PCBs
Toxaphene	ug/kg	160	Pesticide/PCBs
Aroclor-1016	ug/kg	80	Pesticide/PCBs
Aroclor-1221	ug/kg	80	Pesticide/PCBs
Aroclor-1232	ug/kg	80	Pesticide/PCBs
Aroclor-1242	ug/kg	80	Pesticide/PCBs
Aroclor-1248	ug/kg	80	Pesticide/PCBs
Aroclor-1254	ug/kg	160	Pesticide/PCBs
Aroclor-1260	ug/kg	160	Pesticide/PCBs

APPENDIX D
ANALYTICAL QUALITY CONTROL DATA SUMMARY



WELDON SPRING SITE REMEMDIAL ACTION PROJECT

Quality Control Report

metaTRACE, Inc. ▪ 13715 Rider Trail North ▪ Earth City, MO 63045 ▪ (314) 298-8566

CLIENT: MK Ferguson
PROJECT #'s: 100-02 And 100-03
SAMPLE #'s: AA05276 - AA05649 (All Soil Samples)

GC/MS ANALYSIS CONFORMANCE SUMMARY

1) GC/MS TUNE SPECIFICATIONS ☒

   a) BFB PASSED ☒
   b) DFTPP PASSED ☒

2) GC/MS TUNING FREQUENCY - PERFORMED PER METHOD EPA - CLP ☒

3) GC/MS CALIBRATION - INITIAL CALIBRATION CURVE OR CALIBRATION CHECK STANDARD RUN PER METHOD EPA - CLP ☒

4) GC/MS CALIBRATION REQUIREMENTS MET ☒

   a) CALIBRATION CHECK COMPOUNDS ☒
   b) SYSTEM PERFORMANCE CHECK COMPOUNDS

5) BLANK CONTAMINATION - COMPOUNDS LISTED

   a) VOA FRACTION metylene chloride 2.5 ug/l
   b) B/N FRACTION no contaminates
   c) A/E FRACTION no contaminates

6) SURROGATE RECOVERIES MEET CRITERIA (IF NOT MET, REFER TO INDIVIDUAL SURROGATE RECOVERY FORMS FOR ACTUAL RECOVERIES) ☒

   a) VOA FRACTION All surrogates within limits
   b) B/N FRACTION AA05276(2), AA5307(2), AA05553(2), AA05646(2)
   c) A/E FRACTION AA05276(2), AA5307(2), AA05553(1), AA05646(2)

7) SPIKED BLANK WITHIN CONTROL LIMITS Not Applicable ☐

8) SAMPLE HOLDING TIMES MET All holding times were met ☒

9) MINIMUM DETECTION LIMITS ON ALL FRACTIONS AT OR BELOW METHOD SPECIFICATIONS. (IF NOT CHECKED REFER TO INDIVIDUAL ANALYSIS REPORTS FOR THE ACTUAL MDL'S) ☒

10) ALL SAMPLES CONFORM TO EPA CLP QA/QC CRITERIA UNLESS OTHERWISE DENOTED BELOW. ☒

ADDITIONAL COMMENTS:

Richard N. Mauney
PROJECT MANAGER

metaTRACE, Inc. ■ 13715 Rider Trail North ■ Earth City, MO 63045 ■ (314) 298-8566

CLIENT: M K Ferguson
PROJECT #'s: 100-02 and 100-03 (All Soil Samples)
SAMPLE #'s: AA05271 - AA05649

GC/HPLC ANALYSIS CONFORMANCE SUMMARY

1) GC/HPLC CALIBRATION - INITIAL CALIBRATION CURVE OR CALIBRATION CHECK STANDARD RUN PER METHOD GC - EPA CLP / HPLC - USATHAMA ☒

2) BLANK CONTAMINATION - COMPOUNDS LISTED

a) GC no contaminates

b) HPLC no contaminates

3) SPIKED BLANK WITHIN CONTROL LIMITS ☒

4) SAMPLE HOLDING TIMES MET All holding times met ☒

5) MINIMUM DETECTION LIMITS ON GC/HPLC METHODS AT OR BELOW METHOD SPECIFICATIONS ☒

6) ALL SAMPLES CONFORM TO EPA - CLP QA/QC CRITERIA UNLESS OTHERWISE DENOTED BELOW ☒

ADDITIONAL COMMENTS:

Richard H. Manny
PROJECT MANAGER

metaTRACE, Inc. ■ 13715 Rider Trail North ■ Earth City, MO 63045 ■ (314) 298-8566

CLIENT: MK Ferguson
PROJECT #'s: 100-02 100-03
SAMPLE #'s: AA05271 - AA05649 (Soil)

METALS/INORGANIC ANALYSIS CONFORMANCE SUMMARY

1) INITIAL CALIBRATION CURVE OR CALIBRATION CHECK STANDARD RUN PER METHOD EPA - CLP ☒

2) BLANK CONTAMINATION - COMPOUNDS LISTED
   a) METALS no contaminates
   b) INORGANIC no contaminates

3) SPIKED BLANK (LABORATORY CONTROL SAMPLE) WITHIN CONTROL LIMITS ☒

4) SAMPLE HOLDING TIMES MET All holding times met ☒

5) MINIMUM DETECTION LIMITS ON METALS/INORGANICS AT OR BELOW METHOD SPECIFICATIONS EPA CLP ☒

6) ALL SAMPLES CONFORM TO EPA CLP QA/QC CRITERIA UNLESS OTHERWISE DENOTED BELOW ☒

ADDITIONAL COMMENTS:

Richard V. Manny
PROJECT MANAGER

metaTRACE, Inc. ■ 13715 Rider Trail North ■ Earth City, MO 63045 ■ (314) 298-8566

CLIENT: MK Ferguson
PROJECT #'s: 100-02, 100-03
SAMPLE #'s: AA06554 - 70573 Soils U-238

RADIOCHEMICAL ANALYSIS CONFORMANCE SUMMARY

1) GAS PROPORTIONAL COUNTER

- a) BACKGROUND ACCEPTABLE ALPHA ☐
- b) BACKGROUND ACCEPTABLE BETA ☐
- c) PERFORMANCE CHECK ACCEPTABLE ALPHA ☐
- d) PERFORMANCE CHECK ACCEPTABLE BETA ☐

2) ALPHA SPECTROMETER

- a) BACKGROUND ACCEPTABLE ☒
- b) CALIBRATION (KeV/CHANNEL) VERIFICATION ☒

3) ALPHA SCINTILLATION COUNTER

- a) BACKGROUND ACCEPTABLE ☐
- b) PERFORMANCE CHECK ACCEPTABLE ☐

4) METHOD SPECIFIC PARAMETERS

- a) BLANK IN CONTROL ☒
- b) SPIKED BLANK IN CONTROL ☒
- c) RPD FOR DUPLICATES IN CONTROL ☒

ADDITIONAL COMMENTS: _____

Richard A. Manns
PROJECT MANAGER

metaTRACE, Inc. ■ 13715 Rider Trail North ■ Earth City, MO 63045 ■ (314) 298-8566

WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05283
SITE ID: S0-51360-101175-2,4-1187

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	0.7	2.14	1.5	84
CHLORIDE	<1.25	2.07	180	87
FLUORIDE	7.6	3.52	9.88	93
SULFATE	69.5	15.9	85.4	103

SAMPLE NO: AA05292
SITE ID: S0-51445-101065-10,12-1187

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	<0.5	2.5	2.36	94
CHLORIDE	1.1	2.25	3.32	102
FLUORIDE	4	2.75	6.8	98
SULFATE	7.4	3.5	10.89	115

SAMPLE NO: AA05637
SITE ID: S0-49160-100500-0,2-1187

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	1.3	2	3.21	91
CHLORIDE	3.1	2	5.04	84
FLUORIDE	8.8	3.75	12.59	103
SULFATE	40.5	10	50.5	100

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05335
SITE ID: SO-50230-98991-4,6-1187 (MS)

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	11.5	10	21.6	101
CHLORIDE	13.4	10	23.5	101
FLUORIDE	22.4	20	43.6	106
SULFATE	28.5	20	48.1	98

SAMPLE NO: AA05301
SITE ID: SO-51308-100085-2,4-1187

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	0.75	10	10.15	94
CHLORIDE	1.31	10	9.41	81
FLUORIDE	<1.25	10	9.4	94
SULFATE	49.4	25	74.4	100

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05610
SITE ID: SO-49080-100295-0,2-1187

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	2.2	2.5	4.99	115
CHLORIDE	2.8	4.55	7.35	117
FLUORIDE	5.1	3	8.2	104
SULFATE	22	8	31.9	95

SAMPLE NO: AA05300
SITE ID: SO-51308-100085-0,2-1187

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	3.82	10	12.3	89
CHLORIDE	4.78	15	9.3	63
FLUORIDE	3.76	10	13.1	95
SULFATE	15.4	10	23.4	88

SAMPLE NO: AA05328
SITE ID: SO-50140-98820-2,4-1187 (MS)

	SAMPLE CONC	ADDED AMOUNT	SPIKE	PERCENT RECOVERY
NITRATE	10.8	10	20.18	93.8
CHLORIDE	11.9	10	20.1	82
FLUORIDE	21.6	20	39.9	91.5
SULFATE	31.6	25	52.6	84

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WSSRAP PROJECT NO: 100-03
SOIL DUPLICATES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05280
SITE ID: SO-51137-101068-8,10-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	1.83	7.94	3.42	29.33
RESULT #2	1.4	6.5	2.5	26.0

SAMPLE NO: AA05294
SITE ID: SO-51500-101190-2,4-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	1.79	6.94	4.36	53.59
RESULT #2	2.3	5.2	5.9	59.2

SAMPLE NO: AA05613
SITE ID: SO-49080-100295-6,8-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	1.67	21.40	1.20	4.30
RESULT #2	1.4	18.7	0.7	3.7

SAMPLE NO: AA05623
SITE ID: SO-49101-100500-0,2-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	3.58	9.53	1.3	34.24
RESULT #2	3.5	8.8	1.2	34.1

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SAMPLE NO: AA05633
SITE ID: SO-49000-100665-4,6-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	1.43	15.65	2.63	136.20
RESULT #2	1.2	13.2	2.2	114

SAMPLE NO: AA05650
SITE ID: SO-49082-100570-14,16-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	2.47	6.95	0.94	13.66
RESULT #2	1.8	8.7	0.9	12.6

SAMPLE NO: AA05309
SITE ID: SO-51150-100220-8,10-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	8.86	7.62	4.44	26.05
RESULT #2	6.29	6.66	0.94	18.9

SAMPLE NO: AA05556
SITE ID: SO-49000-100295-4,6-1187

	NITRATE	FLUORIDE	CHLORIDE	SULFATE
RESULT #1	1.40	12.10	19.39	27.73
RESULT #2	0.61	10.6	14.6	22.4

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05278
SITE ID: SO-51137-101068-4,6-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6.0	10	<6.0	NC
ARSENIC	6.15	4	11.3	129
BARIUM	140	200	334	97
BERYLLIUM	0.71	5	5.95	104.8
CADMIUM	<0.5	5	4.96	99.2
CALCIUM	----	NA	----	----
CHROMIUM	19	20	32.8	69
COBALT	7.82	50	56.6	97.6
COPPER	5.26	25	28.9	94.6
IRON	----	NA	----	----
LEAD	<3.6	50	49.9	99.8
MAGNESIUM	----	NA	----	----
MANGANESE	615	50	680	NC
MERCURY	<0.1	1	1.23	123
NICKEL	11.1	50	58.3	94.4
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	<0.30	5	4.49	89.8
SODIUM	----	NA	----	----
THALLIUM	<0.5	5	4.3	86
VANADIUM	28.8	50	74.9	92.2
ZINC	20.4	50	65	89.2
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05327
SITE ID: SO-50140-98820-2,4-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6.0	10	16.3	163
ARSENIC	6.56	4	10.9	87
BARIUM	65555.3	200	467	201
BERYLLIUM	1.09	5	6.92	117
CADMIUM	0.6	5	6.24	113
CALCIUM	----	NA	----	----
CHROMIUM	17	20	46.3	147
COBALT	6.2	50	76.6	141
COPPER	12.6	25	45.7	132
IRON	----	NA	----	----
LEAD	8.61	50	73.4	130
MAGNESIUM	----	NA	----	----
MANGANESE	77.8	50	257	358
MERCURY	<0.1	1	0.93	93
NICKEL	18.9	50	86.6	135
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	0.76	5	6.22	109
SODIUM	----	NA	----	----
THALLIUM	<0.5	5	4.4	88
VANADIUM	28.5	50	111	165
ZINC	28.3	50	85.2	114
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05334
SITE ID: SO-50230-98991-4,6-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6	10	14	140
ARSENIC	5	4	9.02	101
BARIUM	146	200	355	104.5
BERYLLIUM	0.71	5	5.98	105.4
CADMIUM	<0.5	5	5.58	111.6
CALCIUM	----	NA	----	----
CHROMIUM	14	20	36.8	114
COBALT	<5	50	54.9	109.8
COPPER	16.7	25	29.1	49.6
IRON	----	NA	----	----
LEAD	6.93	50	53.2	92.5
MAGNESIUM	----	NA	----	----
MANGANESE	221	50	397	NC
MERCURY	<0.1	1	0.76	76
NICKEL	9	50	55.8	93.6
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	0.37	5	4.91	98.2
SODIUM	----	NA	----	----
THALLIUM	<0.5	5	4.2	84
VANADIUM	24.8	50	80.9	112
ZINC	24.9	50	66.1	82.4
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05566
SITE ID: SO-49475-99985-0,2-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6.0	10	15.12	151
ARSENIC	14.13	4	17.6	87
BARIUM	152	200	340	94
BERYLLIUM	0.98	5	6.23	105
CADMIUM	0.69	5	5.46	95.4
CALCIUM	----	NA	----	----
CHROMIUM	18	20	36.4	92
COBALT	10.3	50	56.2	91.8
COPPER	14.8	25	39.2	97.6
IRON	----	NA	----	----
LEAD	14	50	65.5	103
MAGNESIUM	----	NA	----	----
MANGANESE	636	50	638	NC
MERCURY	<0.2	1	1.12	112
NICKEL	15.6	50	60.7	90.2
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	<1.0	5	4.61	92.2
SODIUM	----	NA	----	----
THALLIUM	0.5	5	5.4	108
VANADIUM	35.1	50	82.3	94.4
ZINC	42.5	50	87.9	90.8
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05604
SITE ID: SO-49000-100500-0,2-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6	10	7.8	78
ARSENIC	8.9	4	12.6	93
BARIUM	221	200	402	90.5
BERYLLIUM	0.81	5	5.8	100
CADMIUM	1.34	5	6.18	96.8
CALCIUM	----	NA	----	----
CHROMIUM	22.1	20	41.7	98
COBALT	10	50	57.4	94.8
COPPER	18.2	25	41.2	92
IRON	----	NA	----	----
LEAD	10	50	59.1	98.2
MAGNESIUM	----	NA	----	----
MANGANESE	616	50	625	NC
MERCURY	<0.1	1	1.02	102
NICKEL	23.8	50	68.8	90
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	1.31	5	5.54	84.6
SODIUM	----	NA	----	----
THALLIUM	<1.0	5	4.8	96
VANADIUM	37.5	50	80.4	85.8
ZINC	42.8	50	84.7	83.8
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05620
SITE ID: SO-49132-100440-10,12,1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6.0	50	52	104
ARSENIC	2.35	4	7.75	135
BARIUM	46.6	200	243	98
BERYLLIUM	0.86	5	4.75	78
CADMIUM	<0.50	5	4.2	84
CALCIUM	----	NA	----	----
CHROMIUM	11.6	20	32.7	106
COBALT	<5.0	50	47	94
COPPER	4.61	25	25.6	84
IRON	----	NA	----	----
LEAD	<0.5	50	55	110
MAGNESIUM	----	NA	----	----
MANGANESE	60.3	50	117	113
MERCURY	<0.1	1	1.01	101
NICKEL	7.42	50	48.7	83
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	<0.3	5	3.76	75
SODIUM	----	NA	----	----
THALLIUM	<1.0	5	5.5	110
VANADIUM	7.92	50	60.2	105
ZINC	16.1	50	65.2	98
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05632
SITE ID: SO-49000-100665-2,4-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6	10	20.1	201
ARSENIC	8.15	4	11.19	76
BARIUM	121	200	347	113
BERYLLIUM	0.68	5	5.66	99.6
CADMIUM	<0.5	5	5.33	106.6
CALCIUM	----	NA	----	----
CHROMIUM	19.9	20	35.5	78
COBALT	7.65	50	53.5	91.7
COPPER	7.3	25	29.2	87.6
IRON	----	NA	----	----
LEAD	8.3	50	53.7	90.8
MAGNESIUM	----	NA	----	----
MANGANESE	511	50	722	NC
MERCURY	<0.1	1	0.93	93
NICKEL	14.9	50	60.8	91.8
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	<1.0	5	4.79	95.8
SODIUM	----	NA	----	----
THALLIUM	<0.5	5	4.7	94
VANADIUM	28.6	50	76.9	96.6
ZINC	26.9	50	67.5	81.2
LITHIUM	----	NA	----	----

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WSSRAP
SOIL SPIKES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05643
SITE ID: SO-49082-100570-0,2-1187

	SAMPLE CONC	SPIKE CONC	SAMPLE+SPIKE	PERCENT RECOVERY
ALUMINUM	----	NA	----	----
ANTIMONY	<6.0	10	16.4	164
ARSENIC	14.6	4	16.7	NC
BARIUM	194	200	364	85
BERYLLIUM	0.7	5	6.02	106.4
CADMIUM	<0.5	5	5.46	109.2
CALCIUM	----	NA	----	----
CHROMIUM	15	20	47.9	165
COBALT	7.11	50	54.9	95
COPPER	14	25	38.5	0.98
IRON	----	NA	----	----
LEAD	5.57	50	56.1	101
MAGNESIUM	----	NA	----	----
MANGANESE	405	50	390	NC
MERCURY	<0.1	1	0.75	75
NICKEL	15.6	50	67.5	103.8
POTASSIUM	----	NA	----	----
SELENIUM	<0.5	1	<0.5	0
SILVER	<1.0	5	4.61	92.2
SODIUM	----	NA	----	----
THALLIUM	<0.5	5	3.6	72
VANADIUM	24.4	50	77.7	106.6
ZINC	36.3	50	86.9	100.6
LITHIUM	----	NA	----	----

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WSSRAP
SOIL DUPLICATES
MATRIX: SOIL
UNITS: UG/KG

SAMPLE NO: AA05327
SITE ID: SO-50140-98820-2,4-1187

	RESULT #1	RESULT #2
ALUMINUM	14568	13350
ANTIMONY	ND	ND
ARSENIC	5	8.18
BARIUM	88.7	80
BERYLLIUM	1.5	1.2
CADMIUM	0.8	0.55
CALCIUM	3816	2725
CHROMIUM	23.2	19.6
COBALT	8.5	7
COPPER	17.2	13.4
IRON	23129	17950
LEAD	11.7	8.8
LITHIUM	ND	ND
MAGNESIUM	2622	2150
MANGANESE	107	74.5
MERCURY	ND	ND
NICKEL	25.8	20.1
POTASSIUM	ND	590
SELENIUM	ND	ND
SILVER	ND	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	38.9	33.5
ZINC	38.6	38.1

SAMPLE NO: AA05334
SITE ID: SO-50230-98991-4,6-1187

	RESULT #1	RESULT #2
ALUMINUM	10245	9430
ANTIMONY	ND	ND
ARSENIC	5.9	4.29
BARIUM	171.2	216
BERYLLIUM	0.8	0.71
CADMIUM	ND	0.62
CALCIUM	1900	1622
CHROMIUM	16.4	15.4
COBALT	5.9	7.5
COPPER	19.6	16.9
IRON	12902	12020
LEAD	8.1	11.1
LITHIUM	7.6	7.14
MAGNESIUM	1872	1600
MANGANESE	259	586
MERCURY	ND	ND
NICKEL	10.6	15.1
POTASSIUM	ND	ND
SELENIUM	ND	ND
SILVER	ND	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	29.1	27.7
ZINC	29.2	25.8

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WSSRAP
SOIL DUPLICATES
MATRIX: SOIL
UNITS: UG/KG

SAMPLE NO: AA05563
SITE ID: SO-49000-100180-2,4-1187

	RESULT #1	RESULT #2
ALUMINUM	30009	15030
ANTIMONY	ND	ND
ARSENIC	34	20.7
BARIUM	98	83
BERYLLIUM	1	0.69
CADMIUM	ND	ND
CALCIUM	4584	3400
CHROMIUM	31.8	17.1
COBALT	ND	ND
COPPER	10.8	6.8
IRON	24651	15560
LEAD	4.5	ND
LITHIUM	11.2	5.4
MAGNESIUM	3494	2160
MANGANESE	86.4	90.8
MERCURY	ND	ND
NICKEL	14.3	9.37
POTASSIUM	ND	ND
SELENIUM	ND	ND
SILVER	ND	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	49.8	35.4
ZINC	33.8	17.7

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WSSRAP
SOIL DUPLICATES
MATRIX: SOIL
UNITS: UG/KG

SAMPLE NO: AA05605
SITE ID: SO-49000-100500-2,4-1187

	RESULT #1	RESULT #2
ALUMINUM	10638	13740
ANTIMONY	ND	ND
ARSENIC	7.9	7.17
BARIUM	195	123
BERYLLIUM	0.7	0.64
CADMIUM	0.9	0.61
CALCIUM	2113	1980
CHROMIUM	17.9	21.8
COBALT	11.3	5.6
COPPER	13.2	11.6
IRON	14916	13820
LEAD	14.5	9.32
LITHIUM	8.9	11.3
MAGNESIUM	2101	2210
MANGANESE	802	141
MERCURY	ND	ND
NICKEL	12.5	12
POTASSIUM	ND	520
SELENIUM	ND	ND
SILVER	1.3	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	33.9	34.9
ZINC	27	28.4

SAMPLE NO: AA05285
SITE ID: SO-51360-101175-6,8-1187

	RESULT #1	RESULT #2
ALUMINUM	15031	12400
ANTIMONY	ND	ND
ARSENIC	6.7	4.89
BARIUM	136.9	127
BERYLLIUM	0.8	0.84
CADMIUM	0.7	0.51
CALCIUM	1918	1565
CHROMIUM	20.8	21.9
COBALT	19.9	18.1
COPPER	9.8	8.6
IRON	15728	15620
LEAD	14.4	14.7
LITHIUM	12.3	9.1
MAGNESIUM	1877	1550
MANGANESE	643	755
MERCURY	ND	ND
NICKEL	10.4	11.2
POTASSIUM	ND	575
SELENIUM	ND	ND
SILVER	1.5	1.88
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	36.5	36.4
ZINC	22.3	18.9

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WSSRAP
SOIL DUPLICATES
MATRIX: SOIL
UNITS: UG/G

SAMPLE NO: AA05622
SITE ID: S0-49132-100440-14,16,-1187

	RESULT #1	RESULT #2
ALUMINUM	12524	12560
ANTIMONY	ND	ND
ARSENIC	14.9	4.97
BARIUM	59.4	52.7
BERYLLIUM	1.2	0.63
CADMIUM	ND	ND
CALCIUM	3425	3240
CHROMIUM	17.5	15.3
COBALT	ND	ND
COPPER	10.9	10.2
IRON	20505	21700
LEAD	8.3	7.2
LITHIUM	ND	ND
MAGNESIUM	1809	1725
MANGANESE	173	132
MERCURY	ND	ND
NICKEL	20.9	ND
POTASSIUM	ND	ND
SELENIUM	ND	ND
SILVER	ND	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	38.3	33.6
ZINC	20.2	15.7

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WSSRAP
SOIL DUPLICATES
MATRIX: SOIL
UNITS: UG/KG

SAMPLE NO: AA05632
SITE ID: S0-49000-100665-2,4-1187

	RESULT #1	RESULT #2
ALUMINUM	10528	9377
ANTIMONY	ND	ND
ARSENIC	9.2	7
BARIUM	229	121
BERYLLIUM	0.8	0.68
CADMIUM	ND	ND
CALCIUM	1611	1445
CHROMIUM	17.2	19.9
COBALT	10.9	7.7
COPPER	7.5	7.3
IRON	13813	12780
LEAD	8.9	8.3
LITHIUM	8.7	8.2
MAGNESIUM	2005	1790
MANGANESE	610	511
MERCURY	ND	ND
NICKEL	18.6	14.9
POTASSIUM	ND	ND
SELENIUM	ND	ND
SILVER	ND	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	31	28.6
ZINC	28.3	26.9

SAMPLE NO: AA05644
SITE ID: S0-49082-100570-2,4-1187

	RESULT #1	RESULT #2
ALUMINUM	7401	10690
ANTIMONY	ND	ND
ARSENIC	10	11.6
BARIUM	175	216
BERYLLIUM	0.8	0.69
CADMIUM	ND	0.60
CALCIUM	1865	1690
CHROMIUM	16	25.1
COBALT	7.9	8.78
COPPER	36.5	15.0
IRON	13910	12850
LEAD	7.7	4.9
LITHIUM	ND	9.9
MAGNESIUM	1830	2030
MANGANESE	611	329
MERCURY	ND	ND
NICKEL	14.2	123
POTASSIUM	ND	ND
SELENIUM	ND	ND
SILVER	ND	ND
SODIUM	ND	ND
THALLIUM	ND	ND
VANADIUM	30	31
ZINC	26.4	30.9

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NITROAROMATICS - SOILS
MS/MSD RESULTS
PERCENT RECOVERY

SAMPLE # AA05328
SITE ID: SO-50140,98820

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	95	97
1,3-DNB	96	96
NITROBENZENE	99	101
2,4,6-TNT	84	84
2,6-DNT	84	87
2,4-DNT	70	72

SAMPLE # AA05335
SITE ID: SO-50230,98991

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	103	99
1,3-DNB	106	97
NITROBENZENE	118	103
2,4,6-TNT	92	89
2,6-DNT	96	87
2,4-DNT	80	74

SAMPLE # AA05339
SITE ID: SO-50160,98735

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	96	98
1,3-DNB	96	97
NITROBENZENE	101	99
2,4,6-TNT	86	82
2,6-DNT	86	84
2,4-DNT	72	72

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SAMPLE # AA05342
SITE ID: SD-50160,98735

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	90	104
1,3-DNB	90	101
NITROBENZENE	97	107
2,4,6-TNT	69	89
2,6-DNT	80	90
2,4-DNT	68	77

SAMPLE # AA05345
SITE ID: SD-50160,98735

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	98	97
1,3-DNB	95	96
NITROBENZENE	100	102
2,4,6-TNT	85	86
2,6-DNT	87	87
2,4-DNT	74	72

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SAMPLE # AA05348
SITE ID: SO-50160,98735

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	94	89
1,3-DNB	94	88
NITROBENZENE	101	94
2,4,6-TNT	82	79
2,6-DNT	84	84
2,4-DNT	70	66

SAMPLE # AA05615
SITE ID: SO-49132,100440

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	71	66
1,3-DNB	110	105
NITROBENZENE	95	97
2,4,6-TNT	51	56
2,6-DNT	87	87
2,4-DNT	116	112

SAMPLE # AA05623
SITE ID: SO-49101,100500

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUP
1,3,5-TNB	85	85
1,3-DNB	100	101
NITROBENZENE	94	106
2,4,6-TNT	74	76
2,6-DNT	86	86
2,4-DNT	107	111

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SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: metaTRACE Contract: 100-03

Lab Code: meta Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: 5338, 39, 40 Level:(low/med) low

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	6700	0	3600	54	26- 90
2-Chlorophenol	6700	0	3300	49	25-102
1,4-Dichlorobenzene	3300	0	2200	67	28-104
N-Nitroso-di-n-prop.(1)	3300	0	1700	52	41-126
1,2,4-Trichlorobenzene	3300	0	2100	64	38-107
4-Chloro-3-methylphenol	6700	0	3300	49	26-103
Acenaphthene	3300	0	1000	30*	31-137
4-Nitrophenol	6700	0	2600	39	11-114
2,4-Dinitrotoluene	3300	0	1400	42	28- 89
Pentachlorophenol	6700	0	0	0*	17-109
Pyrene	3300	0	2800	85	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	6700	4800	72	14	35	26- 90
2-Chlorophenol	6700	3300	49	0	50	25-102
1,4-Dichlorobenzene	3300	190	6*	84*	27	28-104
N-Nitroso-di-n-prop.(1)	3300	1900	58	5	38	41-126
1,2,4-Trichlorobenzene	3300	1600	48	14	23	38-107
4-Chloro-3-methylphenol	6700	6000	90	29	33	26-103
Acenaphthene	3300	1900	58	22*	19	31-137
4-Nitrophenol	6700	4800	72	30	50	11-114
2,4-Dinitrotoluene	3300	2900	88	35	47	28- 89
Pentachlorophenol	6700	2200	3*	100*	47	17-109
Pyrene	3300	6000	182*	64*	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 4 out of 11 outside limits
Spike Recovery: 5 out of 22 outside limits

COMMENTS: _____

metaTRACE, Inc. 13715 Rider Trail North ▪ Earth City, MO 63045 ▪ (314) 298-8566

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: metaTRACE Contract: 100-03

Lab Code: meta Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: 5344, 45, 46 Level:(low/med) low

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	6700	0	4600	67	26- 90
2-Chlorophenol	6700	0	3900	58	25-102
1,4-Dichlorobenzene	3300	0	1800	54	28-104
N-Nitroso-di-n-prop.(1)	3300	0	2000	61	41-126
1,2,4-Trichlorobenzene	3300	0	1700	52	38-107
4-Chloro-3-methylphenol	6700	0	4000	60	26-103
Acenaphthene	3300	0	1300	39	31-137
4-Nitrophenol	6700	0	3300	49	11-114
2,4-Dinitrotoluene	3300	0	1700	52	28- 89
Pentachlorophenol	6700	0	3100	46	17-109
Pyrene	3300	56	3500	104	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	6700	4000	60	6	35	26- 90
2-Chlorophenol	6700	3100	46	12	50	25-102
1,4-Dichlorobenzene	3300	1200	36	20	27	28-104
N-Nitroso-di-n-prop.(1)	3300	2300	70	7	38	41-126
1,2,4-Trichlorobenzene	3300	900	27*	32*	23	38-107
4-Chloro-3-methylphenol	6700	4000	60	0	33	26-103
Acenaphthene	3300	800	24*	24*	19	31-137
4-Nitrophenol	6700	5600	84	26	50	11-114
2,4-Dinitrotoluene	3300	1400	42	11	47	28- 89
Pentachlorophenol	6700	4200	63	16	47	17-109
Pyrene	3300	1400	42	42*	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 3 out of 11 outside limits
Spike Recovery: 2 out of 22 outside limits

COMMENTS: _____

metaTRACE, Inc. 2715 River Trail North Earth City, MO 63045 (314) 298-8566

SOLID SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: metaTRACE Contract: 100-03

Lab Code: meta Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: 5350, 51, 52 Level:(low/med) low

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	6700	14J	5400	80	26- 90
2-Chlorophenol	6700	11J	4400	65	25-102
1,4-Dichlorobenzene	3300	0	2100	64	28-104
N-Nitroso-di-n-prop.(1)	3300	0	2000	61	41-126
1,2,4-Trichlorobenzene	3300	0	2500	76	38-107
4-Chloro-3-methylphenol	6700	0	5200	78	26-103
Acenaphthene	3300	0	1600	48	31-137
4-Nitrophenol	6700	0	4800	72	11-114
2,4-Dinitrotoluene	3300	0	2200	67	28- 89
Pentachlorophenol	6700	0	3700	55	17-109
Pyrene	3300	0	3300	100	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol	6700	3700	55	18	35	26- 90
2-Chlorophenol	6700	2800	42	21	50	25-102
1,4-Dichlorobenzene	3300	1300	39	24	27	28-104
N-Nitroso-di-n-prop.(1)	3300	1400	42	18	38	41-126
1,2,4-Trichlorobenzene	3300	1500	45	26*	23	38-107
4-Chloro-3-methylphenol	6700	3700	55	17	33	26-103
Acenaphthene	3300	1100	33	18	19	31-137
4-Nitrophenol	6700	3400	51	17	50	11-114
2,4-Dinitrotoluene	3300	1600	48	16	47	28- 89
Pentachlorophenol	6700	2800	42	13	47	17-109
Pyrene	3300	2700	82	10	36	35-142

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 1 out of 11 outside limits
Spike Recovery: 0 out of 22 outside limits

COMMENTS: _____

metaTRACE, Inc. ▪ 13715 Rider Trail North ▪ Earth City, MO 63045 ▪ (314) 298-8566

3F

SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: metaTRACE **Contract:** 100-03

Lab Code: meta **Case No.:** _____ **SAS No.:** _____ **SDG No.:** _____

Matrix Spike - EPA Sample No.: 5342 MS / 5343 MSD **Level:(low/med)** _____

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	26.7	0.0	13.03	48.8	46-127
Heptachlor	26.7	0.0	9.07	34.0*	35-130
Aldrin	26.7	0.0	8.89	33.3*	34-132
Dieldrin	66.7	0.0	39.24	58.8	31-134
Endrin	66.7	0.0	39.42	59.1	42-139
4,4'-DDT	66.7	0.0	203.18	304.6*	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)	26.7	7.72	28.9*	51.2*	50	46-127
Heptachlor	26.7	7.11	26.6*	24.4	31	35-130
Aldrin	26.7	6.17	23.1*	36.2	43	34-132
Dieldrin	66.7	32.30	48.4	19.4	38	31-134
Endrin	66.7	27.73	41.6*	34.7	45	42-139
4,4'-DDT	66.7	377.73	566.3*	60.1*	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 2 out of 6 outside limits
Spike Recovery: 8 out of 12 outside limits

COMMENTS: _____

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SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: metaTRACE **Contract:** 100-03

Lab Code: meta **Case No.:** _____ **SAS No.:** _____ **SDG No.:** _____

Matrix Spike - EPA Sample No.: 5645 MS
5645 MSD **Level:(low/med)** _____

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	26.7	0.0	9.31	34.9*	46-127
Heptachlor	26.7	0.0	21.59	80.9	35-130
Aldrin	26.7	0.0	13.66	51.2	34-132
Dieldrin	66.7	0.0	20.77	31.1	31-134
Endrin	66.7	0.0	29.90	44.8	42-139
4,4'-DDT	66.7	0.0	89.55	134.3*	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)	26.7	8.92	33.4*	4.4	50	46-127
Heptachlor	26.7	21.51	80.6	0.4	31	35-130
Aldrin	26.7	14.30	53.6	4.6	43	34-132
Dieldrin	66.7	20.60	30.9*	0.6	38	31-134
Endrin	66.7	29.41	44.1	1.6	45	42-139
4,4'-DDT	66.7	84.07	126.0	6.4	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 6 outside limits
Spike Recovery: 4 out of 12 outside limits

COMMENTS: _____

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SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: metaTRACE Contract: 100-03

Lab Code: meta Case No.: _____ SAS No.: _____ SDG No.: AA05714

Matrix Spike - EPA Sample No.: 5714 MS
5714 MSD Level: (low/med) low

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	26.7	0.0	20.3	76.0	46-127
Heptachlor	26.7	0.0	27.6	103.4	35-130
Aldrin	26.7	0.0	14.5	54.3	34-132
Dieldrin	66.7	0.0	46.0	69.0	31-134
Endrin	66.7	0.0	21.8	32.7	42-139
4,4'-DDT	66.7	0.0	0.0	0.0*	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
gamma-BHC (Lindane)	26.7	14.4	53.9	34.0	50	46-127
Heptachlor	26.7	10.7	40.1	88.3*	31	35-130
Aldrin	26.7	7.44	27.9*	64.2*	43	34-132
Dieldrin	66.7	29.2	43.8	44.7*	38	31-134
Endrin	66.7	26.0	39.0*	17.6	45	42-139
4,4'-DDT	66.7	8.31	12.5*	200*	50	23-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 4 out of 6 outside limits
Spike Recovery: 4 out of 12 outside limits

COMMENTS: _____

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